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PRIMARY PRODUCTION, FINANCIAL CONSTRAINTS AND ECONOMIC INSTABILITY:

ZAMBIA SINCE INDEPENDENCE

(Two volumes)

Volume 1

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Doctor of Philosophy

The University of Aston in Birmingham

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SUMMARY

A systematic analysis is presented of the economic consequences of the abnormally high concentration of Zambia's exports on a commodity whose price is exceptionally unstable. Zambian macro-economic variables in the post-independence years are extensively documented, showing acute instability and decline, particularly after the energy price revolution and the collapse of copper prices. The relevance of stabilization policies designed to correct short-term disequilibrium is questioned. It is, therefore, a pathological case study of externally induced economic instability, complementing other studies in this area which use cross-country analysis of a few selected variables.

After a survey of theory and issues pertaining to development, finance and stabilization, the emergence of domestic and foreign financial constraints on the Zambian economy is described. The world copper industry is surveyed and an examination of commodity and world trade prices concludes that copper showed the highest degree of price instability. Specific aspects of Zambia's economy identified for detailed analysis include: its unprofitable mining industry, external payments disequilibrium, a constrained government budget, potentially inflationary monetary growth, and external indebtedness. International comparisons are used extensively, but major copper exporters are subjected to closer scrutiny. An appraisal of policy options concludes the study.

Two technical innovations are stressed: a composite index measuring both instability and the rate and direction of change in time series, applied to commodity prices and export earnings; and the mechanics of a "Development Stabilization Fund" to stabilize the flow of mineral resources to the government budget. A simple macro-economic model was formulated, but instability of the time series caused severe estimation problems (Appendix XI.1).

It is concluded that no domestic policy measures could have prevented substantial economic decline given the deterioration in Zambia's terms of trade; and although Zambia had not defaulted on its formal external debt by mid-1982 it had become a "high-risk" country.

Copper

Debt

Finance

Instability

Zambia

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Statistical units and conventions

The Zambian currency is the kwacha, consisting of 100 ngwee. Its exchange rate against selected currencies is found in Appendix S, Table S.6.4. Until 1967 the currency was the Zambian pound; the kwacha was introduced in that year at the initial rate of Z\$1 = K2.

The production of copper and other commodities is stated in metric tonnes, referred to simply as "tonnes", unless otherwise stated. Three measures are used in the literature and trade sources:

1 tonne = 1,000 kilogrammes = 2,204.62 pounds.

1 short ton = 2,000 pounds

1 long ton = 2,240 pounds

Imports are quoted either "free on board" (f.o.b.) or "cost, insurance and freight" (c.i.f.) as indicated. The Zambian mining companies use the concept of "free on rail" (f.o.r.) reflecting the high relative cost of transporting copper to ocean ports.

In all statistical tables the following conventions are used:

... not available

-- zero or negligible (less than half the smallest unit)

And, behold, there came up out of the river seven kine, fatfleshed and well favoured; and they fed in a meadow: And, behold, seven other kine came up after them, poor and very ill-favoured and lean-fleshed.....: And the lean and the ill-favoured kine did eat up the first seven fat kine: and when they had eaten them up, it could not be known that they had eaten them; but they were still ill-favoured as at the beginning.

(Genesis 41:18-21)

CHAPTER 1 DEVELOPMENT, FINANCE AND INSTABILITY

1.1 Introduction

Countries which rely heavily on exporting primary commodities are vulnerable to externally generated instability. This much is well known, but it is not always clear precisely what form this instability takes in individual countries, although there have been numerous studies of the commodity markets themselves (1). Even less clear is the issue of what policies the exporting countries should adopt to adjust to the different economic problems which "instability" imposes. Indeed it will be seen in the country chosen for this study (Zambia) that the term "instability" is at best misleading, and may well be a euphemism for a more fundamental economic malaise better described as stagnation or decline.

The recent growth of the external indebtedness of the less developed countries (LDCs) has also given rise to increasing concern in governmental, commercial and academic circles (2). A prima facie case exists for arguing that the issues of indebtedness and instability (particularly of export earnings) are directly linked to the escalation of oil prices in 1973 and 1974; the former in the sense that LDC debt has been exacerbated by the cost of energy imports; the latter in that hopes were engendered that the non-oil, commodity-producing LDCs might be able to repeat the success of the OPEC nations in raising and maintaining the oil price (at least in nominal terms). This would be achieved largely through radical

structural adjustments in the pertinent markets by exercising greater control over other commodity prices and reducing the importance of the formal commodity exchanges.

Of greater interest in the present study is the extent to which the problems of primary commodity export dependence, domestic economic instability, financial resource constraints and external debt are inter-related, and the precise ways in which such dependence is transmitted to the domestic economy. This chapter will examine various issues in development theory and research, commencing with a brief review of international economic performance during the 1970s. An attempt is then made to produce a list of characteristics of less developed countries which represent some stylized facts of development. Attention is given to the need for, and means of, financing development, and this is linked to the instability caused by many LDCs' dependence on one or a few primary commodity exports for their foreign exchange earnings. The concept of economic instability is not uncontroversial, and alternative interpretations are discussed, together with an appraisal of the tendency to apply orthodox economic stabilization measures to economies where fundamental structural imbalances are more plausibly to blame than misguided policies or minor short-lived maladjustments. Finally the chapter concludes with a discussion of the accumulation of external indebtedness among less developed countries. Particular mention is made of the International Monetary Fund (IMF) both as a source of finance and in its perceived role of international economic stabilization.

1.2 An overview: Post-1973 performance in the developing countries

The quadrupling of petroleum prices in 1973 and 1974 served to initiate radical alterations in many of the relationships and balances which existed up to 1973, and of no group of countries is this a more valid statement than the non-oil producing countries. It would be wrong to assert that the changes which occurred were due only to energy prices, although these undoubtedly acted as a trigger or catalyst for many of the problems which were to develop during the 1970s. During the first years of the decade, many of the industrial countries initiated programmes to stimulate their economies by deficit financing and monetary expansion. Growth rates were indeed increased, but so too was the potential for inflation, as demand outstripped their economies' production capacity. Another contribution to international economic instability was the "boom" in primary commodity prices in 1973 and 1974, which provided a very temporary "cushion" against the effects of higher energy and other import prices, but which (for precisely this reason) may have created a false sense of security among some developing countries who did not perceive a need to undertake any substantial adjustment measures.

This dissertation will examine the consequences for an individual economy of relying heavily on the export of a single primary commodity, copper, whose price has not only been highly unstable, but has suffered a sharp decline relative to the producing countries' imports. It is a common contention, implicit for instance in

stabilization programmes supported by the International Monetary Fund, that instability is primarily caused by domestic mismanagement (particularly excessive government deficit financing), or at least that its remedy lies in the adoption of the correct domestic economic policies. This chapter and subsequent ones will argue that the instability experienced by many countries, and particularly Zambia, had external origins although it may have been exacerbated by domestic policies.

Some indication of the nature of the problems faced by the non-oil producing developing countries may be gained from Table 1.1, while identical information is presented for the Zambian economy in Table 1.2. The year 1973 was chosen since this was the last year before the effects of the oil price "revolution" became evident. Thus it is found that economic growth slowed appreciably, accompanied by a significant increase in the rate of price inflation. The size of developing countries' current account deficits relative to gross domestic product provides good evidence of the extent of the financing requirements presented by the economic conditions of the late 1970s, and the cause may be attributed at least in part to the decline in the terms of trade. In view of the comments in the preceding paragraph about the government deficit being an important cause of instability, it is particularly interesting to note that there was virtually no change in the size of the fiscal deficit relative to total government expenditure. Section 6 provides some evidence of the extent of the increase in external indebtedness, but as will be found in chapter 9, the experience of individual

countries has varied widely, with the result that the data used here do not reflect the seriousness of the position in which some countries have found themselves. This latter comment could be applied to most of the indicators when used to measure the performance of the developing countries en masse, and it is often beneficial to examine individual countries, regions or other groupings.

When Zambia is taken in isolation it is found to have fared significantly worse than the "average" developing country as typified by Table 1.1. The indicators for Zambia in Table 1.2 show a significantly worse growth record (which pre-dated the oil price "revolution"), and a very much worse relative shift in the current account of the balance of payments. In the latter case a substantial surplus was turned to a deficit approximately equal to the average for developing countries in 1980. It is clear that the terms of trade were an important factor: there was a 57 per cent deterioration compared to the average for non-oil developing countries of 14 per cent. It is also interesting to note that, although Zambia had a very much larger government deficit (in relative terms) than the average, its inflation rate was lower. This is a feature of the economy which will be explored in Chapter 8, but it is stressed from the outset because it provides some indication that the instability affecting Zambia was indeed external rather internal in origin.

With regard to Zambia's external indebtedness, research on this thesis commenced with the impression that Zambia had a "debt problem",

and that the accumulation of an unserviceable debt burden was one of the cause of the country's external payments difficulties. The data in Tables 1.1 and 1.2 suggest that Zambia's experience in this area was not exceptional, and indeed that it was marginally better than the average, an impression confirmed in Chapter 9. The conclusion is reached that as with so many of the country's other problems, the "debt problem" was a symptom of the fundamental malaise rather than a cause of it.

This thesis will undertake an analysis of this "malaise" with particular reference to Zambia's macro-economic structure, a discussion of the key mining sector, its balance of payments, the government budget and its external indebtedness, centred around the theme of instability. An attempt will be made to assess the extent to which this instability is attributable to internal and external factors, coming to the conclusion that the latter are more significant. This conclusion will be found to present a rather more intractable problem for policy makers, than a situation in which the instability has domestic origins.

1.3 Some stylized facts of development

The issues of external financial imbalances - particularly foreign undebtedness - are often viewed from a short-term perspective. However, it is essential that they should not overshadow or be separated from the structure of the economies concerned or their development objectives. Thus it is useful at this point to outline some features which characterize the less developed countries. At

Table 1.1 Selected Economic Indicators: Non-Oil Developing Countries (a)

(Percentages)

	1973	1980	Annual averages (g) 1967-72	1973-80
1. Growth of GDP - Change from preceding year (b)	6.3	4.4	5.8	4.9
2. Changes in prices (from preceding year)(c) - median	10.4	15.0	4.3	13.2
3. Current account balance as a percentage of GDP - median	-4.1	-10.1	...	...
4. Terms of trade (d) (1965 = 100)	106.2	92.6	...	...
5. Government overall surplus as a percentage of total expenditure (e)	-14.6	-14.1 (f)	...	...
6. External debt (at year end):				
As a percentage of GDP	89.3	93.3	...	...
Rate of increase	...	...	...	21.0
6a. External debt service				
As a percentage of exports	14.0	18.2	...	...
Rate of increase	...	...	...	24.6

Memorandum item:

Percentage of export earnings from principal primary commodity (median), 1978: 41.5

Source: Calculated or extracted from the following International Monetary Fund publications:
World Economic Outlook, 1981 (lines 1, 2, 3, 6); International Financial Statistics Supplement on Price Statistics, 1981 (line 4); Government Finance Statistics Yearbook, 1981 (line 5); Table 2.4 (memorandum item).

(a) Includes all countries covered by IMF International Statistics. Exact number may vary due to data availability. See IMF IFS Yearbook page 8. Maximum number is 99.

(b) Weighted by average U.S. dollar value of GDP in previous three years.

(c) As measured by consumer price index.

(d) Net terms of trade = unit value of exports expressed as a percentage of unit value of imports.

(e) Surplus or deficit after all revenue and expenditure but before any government borrowing weighted by GDP in 1975.

(f) 1979.

(g) Annual averages calculated as geometric mean.

Table 1.2 Selected Economic Indicators: Zambia

(Percentages)

	1973	1980	Annual averages (a) 1967-72	1973-80
1. Growth of output (b)	-1.8	0.9	2.8	-0.1
2. Changes in prices (c)	9.0	11.5	5.9	11.9
3. Current account balance as a percentage of GDP	5.9	-10.5	...	...
4. Terms of trade (d) (1965 = 100)	97.4	41.5 (f)	...	...
5. Government overall surplus deficit as a percentage of total expenditure (e)	-36.1	-36.1 (f)	...	...
6. External debt				
As a percentage of GDP	26.4	43.6	...	...
Rate of increase	...	...	...	17.8
6a. External debt service				
As a percentage of GDP	9.3 (g)	20.8	...	...
Rate of increase	...	...	...	18.9
Memorandum item:				
Percentage of export earnings from principal primary commodity:	92.9			

Sources: Appendix S; Table S.1.1 (line 1); Tables S.6.1 and S.1.2 (line 3); Table S.9.1 (line 6); Table 2.8 (line 2); Table 2.4 (memorandum item).

(a) Annual averages calculated as geometric mean.

(b), (c), (d), and (e) As table 1.1

(f) 1978.

(g) Excludes payments for redemption of ZIMCO bonds.

least some of the following features would be expected in these economies (3):

- (i) low standards of living whether measured by per capita incomes or by some basic needs criterion such as nutrition, health, housing, education, etc.;
- (ii) a high degree of "absolute" poverty;
- (iii) low levels of domestic saving, or stated alternatively, a low capacity to invest;
- (iv) highly skewed income distributions;
- (v) a rapid growth of population giving rise to a high dependency ratio (4);
- (vi) limited urbanisation, but with a high rate of migration from rural into urban areas;
- (vii) a large "subsistence" sector producing sufficient goods only for its own needs at low productivity levels;
- (viii) dominance of agricultural activity (only poorly reflected by conventional national accounting data);
- (ix) high levels of unemployment and underemployment;
- (x) heavy dependence on one or a very few primary commodities for export earnings;
- (xi) the existence of a substantial degree of economic dualism (5);

On point (x) McNicol (1978, p. 15) is succinct:

"It is commonly assumed that the LDCs obtain most of their export earnings by selling commodities to the (developed countries), that commodity prices are subject to large fluctuations, and that the export earnings to LDCs are extremely unstable. The facts are somewhat more complicated, but these views are substantially correct."

Todaro (1977) notes that this source of instability arises from an unequal distribution of economic and political power between developed and developing countries, and that this inequality is reflected not only in the control of international trade, but also in the terms under which technology and capital are transferred to the LDCs.

Taylor (1979) introduces a number of stylized facts which have a particular relevance in the context of model building in developing economies. In modelling the economies of the developed countries, Taylor implies that it is possible to "get away with" a single sector, for example using an aggregate production function. In developing economies it becomes rather more important to distinguish two, three or more sectors. Possible distinctions would include one between production for export and domestic consumption, with an extension that either or both may be dependent on intermediate imports. Since there is such a wide variation in the level of technology used between, say, subsistence agriculture and mineral extraction, it is often necessary in model-building to include at least an agricultural sector and an industrial one. This becomes more important when it is considered that agricultural products, the demand for which can be fairly price- and income-elastic, behave differently in terms of price and demand characteristics. In some LDCs, particularly the "newly industrializing countries", Taylor suggests that it may also be desirable to distinguish between consumption and capital goods industries, although the reasons why

this would be more necessary than in a developed economy are not entirely clear.

Taylor goes on to make an extremely important observation: money is the most important financial asset in most LDCs and is the only one which individuals wish to hold in substantial quantities. Thus analyses and models which depend on the existence of "bond" markets are rendered irrelevant, and a distinction between monetary and fiscal policies becomes obscure, since any government debt must be financed by "printing" money. Moreover, distributional processes are more important in LDCs: for instance, shifts in the real income of an economic group can be caused by changes in relative price levels, a pertinent and not infrequent example being the loss of real income suffered by farmers when agricultural prices decline relative to those of manufactured goods, a process sometimes referred to as falling rural/urban terms of trade.

A final and most important practical characteristic noted by Taylor is that the ability of planners to apply econometric and other modelling techniques is severely restricted by data deficiencies and limitations which are so much more common than in developed countries.

These stylized facts or characteristics represent a valuable frame of reference against which the specific case of Zambia, studied in subsequent chapters, can be compared.

1.4 Financing development

The ability to distinguish certain key characteristics of LDCs also means that valuable inferences can be drawn concerning the dynamic process of development. Thus in analyzing the causes and nature of the transition from a traditional to a developed economy, Chenery (1979, Chapter 9) claims that there is considerable similarity among countries as they develop in a number of important features. These will include (in any historical period) similar responses in the pattern of consumer demand to rising real incomes, and a necessity to accumulate physical and human capital in order to increase per capita output. Moreover Chenery says that countries will have access to similar technology and to international trade. This latter contention is more controversial since LDCs access to international trade is unequally restricted by differential tariff barriers, their access to international capital markets is by no means equal among countries, while access to technology may be subject to other limitations such as their willingness to accept a high level of direct investment by private foreign corporations.

Nevertheless it is possible to follow Chenery in noting three areas of economic structure which are affected by the process of development. Firstly, productive capacity must be increased by an accumulation of physical capital and labour skills. Secondly, there will be changes in resource use, for instance in terms of demand patterns, production, trade and factor utilization; and thirdly, socio-economic changes may be expected - for instance, urbanization,

income redistribution, shifts in the demographic structure, and new modes of ownership.

It could be argued that this type of analysis places too little emphasis on the financial constraints which face many developing countries. Harrod-Domar models (6) lead immediately to one possible such constraint on the achievement of a desired growth rate - savings. Such models allow the estimation of target levels of savings and investments, so that if the investment required is greater than intended savings then a domestic financial constraint is present. If in addition to this, imports are required in excess of the economy's capacity to import then it can be shown that the volume of resources needed to fill the savings-investment gap will be insufficient to achieve the target growth rate, i.e., the import of foreign exchange gap becomes the dominant constraint. A fuller exposition of such dual-gap analysis is the subject of Appendix I.1.

This dual-gap analysis is developed by Chenery and Strout (1964) and Chenery and MacEwan (1979). In the former a typical sequence is identified as a dominant domestic resource (savings-investment) gap in the earlier stages of development followed by a dominant and persistent external resource (export-import gap), and a net inflow of foreign "aid" can be an answer to either constraint. Chenery and Strout also suggest certain criteria which will determine whether an economy is making progress towards self-sustaining growth:

- the rate of growth of investment must exceed the target GDP growth rate;

- the marginal savings rate should exceed the target investment growth rate unless the average rate is already higher than the latter; and
- either the growth of exports should be greater than the target growth rate for GDP or the marginal propensity to import should be less than the average ratio.

Those countries which do approach self-sustaining growth tend to follow a profile in which there is an initially high, but declining, reliance on external capital inflows.

The use of a dual-gap approach in the analysis of development finance serves to accentuate the peculiarly important role of foreign capital inflows to the LDCs although the major part of LDC investment is financed by domestic savings. The relationship between saving and investment will not be examined in depth, but it is of interest to note the significant differences of theoretical interpretation which exist in the literature concerning the role of savings.

Firstly, a classical view persists in which savings are an essential pre-condition for investment, and hence for economic growth. It is this perception which is reflected in policy prescriptions which call for the mobilization of resources for development. This has led to the adoption of monetary policies intended to promote financial intermediation in the belief that an investible surplus exists and can find a productive outlet if appropriate financial institutions are established. This view also gives rise to fiscal

policies intended to raise the marginal propensity to save, or conversely to lower marginal consumption, which could be achieved by taxes designed to reduce private consumption. The former (monetary) policies are essentially aimed at raising the level of voluntary savings, while the latter represent involuntary savings for the purpose of government investment.

The second perspective on the role of savings is almost diametrically opposed in terms of policy implications and theoretical specification. Essentially Keynesian, it stipulates that the volume of investment determines the level of savings. This view is based on earlier discussions such as Kaldor (1956) and Robinson (1962), who argue that increases in savings result from a larger share of profits in national income, profit earners having a higher propensity to save than wage earners. This approach also has the implication that inflation can encourage investment by a decrease in the real rate of interest and increasing the nominal rate of return on capital investment. While not necessarily immediately applicable to the situation of most developing economies where the profit earning class is relatively small, the approach does offer a possible analytic framework.

Inflation has a central position in the third major view, albeit in a more negative sense. The "quantity theory" approach suggests that inflation is a tax on real money balances, transferring income from holders of money balances to the government. The argument can be sustained as a source of growth only if the

government pursues deficit financing to cover investment expenditure by increasing the money supply - assuming that the velocity of circulation remains unchanged. Also inflation will result only where capital is fully employed or where supply is subject to other short-term constraints. Writers such as Shaw (1973) view unfavourably any attempt to use inflation in this way since he holds that real cash balances are not intrinsically different from physical capital in a wealth-holder's portfolio, but are instead a part of the debt created by capital accumulation. Thus to Shaw the monetary system must be allowed to operate without hindrance in order that capital markets may function at full efficiency, and an "inflation tax" would act as a distorting factor. Shaw thus regards any long-term inflation as inimical to capital accumulation to an even greater extent than main stream "monetarists" such as Friedman. But as Thirlwall (1974) notes the view of inflation as a tax, while recognised by Keynes, was of subsidiary interest to the role of inflation in promoting investment by its effect on profits.

These views of saving, both domestic and foreign, are not of merely peripheral interest in this study, since they determine the perception of the nature and causes of, and remedies for, the instability which appears so common a feature among LDCs. Thus writers such as Shaw, see the root of instability as lying in internal policy errors which cause periodic fluctuations in the principal economic variables, whereas a more common view is that instability is significantly due to external factors (see Cole (1976), Behrman (1978), Dhonte (1979), McNicol (1978)). (7)

However what is not left in doubt is that most LDCs suffer from constraints both on the availability of foreign resources and domestic savings. The remainder of this chapter is devoted to the consideration of three issues relating to the former; firstly, the importance of commodity markets and the perceived need to stabilize prices, secondly, the question of macro-economic stabilization policy, and thirdly, the dynamics of external debt in the LDCs.

1.5 Commodity markets and price stabilization

One of the stylized facts of developing countries noted in section 1.3 was their heavy dependence on one or a few primary commodities for export earnings. This generalized observation will be explored in greater detail in Chapter 2 but is supported by the summary data in Table 1.3. Several trends are suggested and merit brief comment. The proportion of world trade arising from primary commodities (line 1) fell during the twenty years covered, a fall which is more pronounced when fuels are excluded: in 1955 non-fuel commodities accounted for 47 per cent of world exports, a share which had fallen to 26 per cent by 1976. At the same time, although the developing countries' share of world exports (line 2) appears not to have declined, the exclusion of the major petroleum exporting countries reveals a declining share of world exports originating in the developing countries (18 per cent in 1955 and 11 per cent in 1976). An integral part of this decline was a change in the structure of the exports of the developing countries (line 3) in which foodstuffs, agricultural raw materials and ores and metals all

Table 1.3 Primary Commodities in Developing Countries'
Exports and World Exports

(Percentages)

	1955	1970	1976
1. Proportion of primary commodities (a) in total world exports (b)	57.9	42.4	45.8
Of which: fuels (c)	11.0	9.2	20.1
2. Proportion of developing countries' (d) exports in world exports	25.5	17.8	25.9
Of which: major petroleum exporting countries	7.1	6.0	14.5
3. Proportion of indicated category in total developing countries' exports			
Foodstuffs (e)	36.7	26.5	15.0
Agricultural raw materials (f)	20.5	10.0	4.5
Ores and metals (g)	10.1	13.3	5.4
Fuels (h)	24.9	32.9	58.9
Manufactured goods (i)	7.6	16.7	15.8
4. Proportion of developing countries in world exports of:			
Cocoa	...	86.6	83.0
Coffee	...	94.9	91.3
Cotton	...	69.8	61.3
Rubber	...	71.1	74.8
Sugar	...	65.0	52.9
Crude petroleum	...	89.0	92.0
Copper (refined)	...	45.8	37.3
Tin	...	80.6	82.3
		<u>1978</u>	
5. Proportion of developing countries deriving more than given proportion of export earnings from one commodity (j)			
50 per cent		42	
60 per cent		33	
70 per cent		24	
80 per cent		16	
90 per cent		13	
6. Proportion of developing countries deriving more than 40 per cent of GDP from exports (j)		19	

Table 1.3 Primary Commodities in Developing Countries
Exports and World Exports (Concluded)

Sources: (Sections 1-4) United Nations Conference on Trade and Development, Handbook of International Trade and Development Statistics, 1979 (Tables 3-2A, 1.9, 3.2B and 4.4. Sections 5 and 6 calculated from data in International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington: International Monetary fund.

- (a) SITC groups 0 to 4 plus 67 and 68.
 - (b) Valued in U.S. dollars.
 - (c) SITC group 3.
 - (d) Excludes developing "socialist" or "non-market" countries.
 - (e) SITC groups 0, 1, 22 and 24.
 - (f) SITC group 2 less groups 22, 27 and 28.
 - (g) SITC groups 27, 28, 67 and 68.
 - (h) SITC group 3.
 - (i) SITC groups 5, 6, 7 and 8 less groups 67 and 68.
 - (j) Based on 83 countries in 1978 and most recent previous year.
- Includes major oil exporters.

declined quite sharply, while fuels and manufactured goods increased. In the case of fuels the increase was in large measure due to price rises, and this in turn exaggerates the size of the decline in other commodities.

Two factors are put forward to explain these trends: firstly, a decline in the terms of trade would cause an apparent decline in the share of exports of the countries involved if shares are measured in terms of current or nominal values. Secondly, the demand for many primary commodities may be income inelastic in the major importing countries: for instance it is unlikely that demand for foodstuffs in high income countries would grow as rapidly as demand for other consumer goods after a certain level of consumption has been achieved. Similarly technological change generally results in the more efficient use of raw materials in industrial processes. Thus primary commodity exports are likely to grow less rapidly than the world total exports. These issues will be examined in greater detail in Chapters 5 and 17. In spite of these observations developing countries can be seen to remain heavily dependent on exports (lines 5 and 6), as well as being very significant sources of the commodities in question as is suggested by the selected commodities listed in line 4.

The features discussed with respect to Table 1.3 do not necessarily mean that predominantly primary producing LDCs will be different in economic structure from developed countries or from other LDCs. However there are certain characteristics which do

distinguish the primary producers, as the World Bank (1979, Chapter 9) has suggested. The comments in the following six paragraphs are based on this World Bank discussion, which are to a certain extent drawn from the Bank's experience in LDCs' policy formulation.

Subsequent chapters will explore the extent to which these traits are present in the Zambian economy. Since Zambia is a producer of copper, the remarks here will be confined to mineral producing nations.

In the first instance the high risk element and continual uncertainty of mineral exploration and extraction has created a tendency to vertical integration in the extraction of some minerals. For instance companies have developed which are involved in several stages of the exploration, extraction, refining, transportation, further processing and distribution of the metal and its fabricated products. This together with the high capital intensity of mineral extraction and refining, and the fact that the demand for mineral products comes from the industrial countries increasingly deficient in terms of their own natural resources, has led to the heavy involvement of transnational corporations in mining operations throughout the world.

One of the features identified in the Bank's discussion is the high level of "economic rent" which is involved in these operations. This rent is apparently defined by the Bank as any profit in excess of that return to the investor which is necessary to induce him to invest. If appropriated by the company it would then form an

"excess" profit, while the government of the country in question may appropriate it in the form of tax revenue. However, even if the government can successfully appropriate this mineral revenue, and ensure that all foreign exchange earnings are received, the mineral producer may still be placed in a dilemma: mineral reserves are finite, often with perhaps only 20-30 years forecast production, so it must, in its long-term interest, adopt investment policies which will stimulate the growth of output in other sectors. Yet it must also satisfy immediate aspirations for increases in living standards, through higher current consumption, and in many countries the latter has prevailed over longer term considerations.

Another feature of the mineral producing LDCs, arising from the capital intensity and foreign involvement of mining operations, is the high degree of economic dualism created. The mineral sector often exists as an isolated enclave, with limited supply and demand linkages with the rest of the economy. Its capital intensity and implicitly high labour productivity, tend to create an elite group of workers - highly skilled and well paid - whose conditions of work and living bear more resemblance to those in other more developed economies, than within their own country. There is, therefore, a tendency for cost-push inflationary pressures to build up, as other workers attempt to "catch up" with those in the mineral enclave. In subsequent chapters it will specifically be noted the extent to which these features and effects have occurred in Zambia.

There are various other ways in which mineral producing LDCs show distinct similarities as a group. The World Bank report notes that the development of the non-mineral sectors and most noticeably agriculture, has tended to be given low priority in investment programmes and economic policy formulation, as the ready availability of foreign exchange and fiscal receipts reduces the perceived urgency of developing these sectors in order to achieve economic diversification. Moreover the existence of a single dominant export sector tends to lead to exchange rate policies which may be appropriate to the mineral sector, but which do not provide an incentive for the expansion of other exports.

Given these observations concerning the position of the mineral producers, it is perhaps not surprising that these countries remain singularly vulnerable to instability and periodic domestic economic crises caused by variations in the circumstances of international trade, since there has been so little economic diversification, in terms of production for either domestic consumption or export. However it must be noted that the different circumstances of various mineral producers can make a substantial difference as far as policy prescriptions are concerned. Countries with large reserves per capita and small populations, such as certain oil producers like Saudi Arabia and Kuwait, have the potential for highly capital intensive industrialization, whereas countries like Nigeria or Indonesia with relatively low per capita resource endowments and large populations have only limited scope for development into technologically sophisticated industrial economies and are perhaps

more likely to benefit from the expansion of agriculture and those industries which use relatively labour intensive techniques.

While a similar analysis can be applied to agricultural exporting LDCs there are at least two crucial differences which alter analysis and policy formulation: firstly, any agricultural product, correctly managed, represents a renewable resource, so that the need to develop completely new areas of economic activity is not so pressing; and secondly, a large proportion of the output of agricultural exporters is produced by indigenous small-holders who are more fully integrated with the rest of the economy in terms of investment and consumption, supply and demand linkages. The tendency to a dualistic pattern of development is thus lessened, but not removed, since other factors (economic, cultural and historical), such as patterns of land tenure and ownership, and initial income distribution, can in themselves create dualism.

These comments have been based on generalizations made by the World Bank in their World Development Report, 1979, and may be taken as indicative of a general pattern among LDCs dependent on primary commodities, particularly minerals. Subsequent chapters will reveal the extent to which these are borne out in Zambia in the context of comparative data.

There is no agreement among economists as to the exact effects of commodity market instability on the earnings of LDCs. For instance, conclusions differ as to whether or not there has been a long-term deterioration in the terms of trade, as Nappi (1979) has

noted, concerning the work of Prebisch and Myrdal, who contend that there has been a deterioration, and others, such as Viner, Kindleberger and Meier who claim long-term stability in the terms of trade. No doubt a part of the difference is due to variations in the exact definition of the terms of trade and the theoretical approach used, as both Nappi and R.T. Bell (1979) have noted. This is an issue requiring some further discussion, and it will be taken up in Chapter 7. It is often difficult to distinguish satisfactorily between temporary cyclical variations and permanent structural adjustments in commodity price levels and hence in the terms of trade. Thus, shortly after the 1973/4 oil price rises Josling (1974) wrote:

"A succession of price rises in individual commodities dating from 1970 culminated in a general explosion of prices reaching a somewhat tentative peak in mid-1974. Even allowing for a fall-back in these prices as new supplies are encouraged on to the market and as firms adjust their purchasing and stock policies, few people would expect an early return to the "normal" situation of the 1960's".

It has become clear in subsequent years that, with the exception of oil, most commodities have not experienced a continuation of the trends established at the start of the 1970's and that many, particularly minerals, have, on the contrary, fallen quite substantially below their real purchasing power in the 1960's. Thus as Table 1.4 shows, while it may be true that commodity prices are well above the levels reached during the 1960's in current prices, when they are deflated by an appropriate index (of world unit export values) the pattern displayed by the constant price index for all commodities is one of fairly consistently high prices in the 1960's. In the 1970's

the movement of relative commodity prices has been rather more erratic, but the average value for the all commodities index during the period after 1970 was 116.3, compared with 125.2 during the previous decade. The peak in real values was in fact reached in 1973, not 1974; and after 1974 prices were consistently below the levels of the 1960's. Table 1.4 also shows that the behaviour of prices has by no means been uniform. Coffee and tin appear to be the only two of these eight major commodities to have seen a sustained increase in their real value. Copper, rubber, cotton, zinc and wheat have all experienced considerable declines from their levels during the 1960's, while sugar, after very substantial gains during the mid-1970's has returned to its former level. From this brief review it would seem that copper has been one of the most seriously affected of the commodities, with a decline of 56 per cent in its real price between 1965 and 1979. Further analysis of the instability of copper prices may be found in Chapter 5.

Whatever is the exact effect of price instability, it is generally held that some form of stabilization is required. However there remains considerable disagreement as to whether this should take the form of export earnings stabilization, such as is provided by the International Monetary Fund's Compensatory Financing and Buffer Stock Financing Facilities or the EEC/ACP (8) Stabex Scheme, or whether it should hope to stabilize the price of individual commodities, as was the original intention underlying UNCTAD's Common Fund.

Table 1.4 Commodity price indices in nominal values and relative to world export unit values (1975 = 100)

A. Current Prices									
	All commodities (a)	Copper (b)	Tin (c)	Petroleum (d)	Rubber (e)	Coffee (f)	Sugar (g)	Cotton (h)	Wheat (i)
1960	51.2	55.0	32.1	14.0	127.8	46.6	15.5	53.0	38.9
1965	53.6	104.8	57.8	12.4	86.0	56.6	10.0	54.4	39.9
1967	51.8	92.3	49.4	12.4	66.6	51.2	9.5	57.9	44.1
1969	55.5	119.1	50.9	11.9	87.6	53.2	15.8	52.5	39.2
1970	57.5	114.9	53.7	12.1	70.6	69.7	18.2	54.5	36.9
1971	54.2	87.8	51.2	15.4	60.2	61.6	22.2	63.9	41.4
1972	61.8	86.8	55.0	17.7	60.5	69.5	35.8	68.4	46.8
1973	95.3	144.7	70.4	25.2	117.7	85.8	46.7	117.0	93.8
1974	121.6	166.6	119.7	91.0	133.1	93.8	146.4	122.8	120.7
1975	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1976	112.2	113.9	111.5	107.4	132.4	195.9	57.0	146.1	89.2
1977	135.1	106.4	157.5	115.7	139.1	316.1	39.9	134.3	69.2
1978	128.8	110.6	187.4	118.5	167.2	213.9	38.6	135.6	85.7
1979	149.4	161.0	225.5	158.3	214.7	233.9	47.6	145.4	107.4

B. Prices Relative to World Export Unit Values (j)									
1960	128.0	137.5	80.2	35.0	319.5	116.5	38.7	132.5	97.2
1965	127.6	249.5	137.6	29.5	204.8	134.8	23.8	129.5	95.0
1967	120.5	214.6	114.9	28.8	154.9	119.1	22.1	134.6	102.6
1969	126.1	270.7	115.7	27.0	199.1	120.9	35.9	119.3	89.1
1970	122.3	244.5	114.2	25.7	150.2	148.3	38.7	116.0	78.5
1971	110.6	179.2	104.5	31.4	122.9	125.7	45.3	130.4	84.5
1972	114.4	160.7	101.8	32.8	112.0	128.7	66.3	126.7	83.0
1973	144.4	219.2	106.7	38.2	178.3	130.0	70.7	177.3	142.1
1974	132.2	181.1	130.1	98.9	144.7	102.0	159.1	133.5	131.2
1975	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1976	110.0	111.7	109.3	105.3	129.8	192.1	55.9	143.2	87.4
1977	121.7	95.8	141.9	104.2	125.3	284.8	35.9	121.0	62.3
1978	105.6	90.7	153.9	97.1	137.0	175.3	31.6	111.1	70.2
1979	101.6	109.5	153.4	107.7	146.0	159.1	32.4	98.9	73.1

Source : International Monetary Fund, International Financial Statistics Yearbook, 1980, and author's calculations.

- (a) Excludes petroleum.
- (b) London Metal Exchange cash settlement price.
- (c) As (b).
- (d) Ras Tanura f.o.b. for Saudi light.
- (e) New York Price, all origins.
- (f) New York, all coffee.
- (g) New York, Caribbean sugar

While support for price stabilization is widespread (see Adams and Klein (1978), Goodwin and Mayall (1979), Behrman (1978), Hallwood (1979), McNicol (1978), and Nappi (1979), there is less consensus on how it can be achieved. For instance Nappi is pessimistic about the use of individual commodity by commodity agreements, a view similar to that of the developing primary producers themselves, who have tried to insist that price stabilization be discussed only in the context of a global and integrated programme. Nappi continues by noting that other forms of price stabilization have proved unsuccessful (e.g., the UNCTAD Integrated Programme on Commodities has not produced consensus between producers and consumers, and efforts to form producer cartels along the lines of OPEC have not worked). He puts forward four reasons why consumer countries say this could be so:

- (i) if prices are maintained at an artificially high level then a transfer of human and physical resources into the production of that commodity will occur that is not warranted by the long-term equilibrium price for that commodity;
- (ii) as a corollary to (i) the diversion of resources to a favoured export sector can prevent diversification of the economy of a primary producer;
- (iii) if intervention on the commodity markets results in higher commodity prices then this will result in inflation in the industrial economies which will eventually be transmitted back to the LDCs in their manufactured

imports thus cancelling any temporary gain in the terms of trade;

- (iv) in certain circumstances it can be shown that price stabilization can have a destabilizing impact on total receipts depending on the nature of the market and the price elasticity of demand. (9)

Nappi goes on to show that these arguments are mainly grounded in the assumptions of neo-classical economics and are challenged by many development economists. For instance, in the case of (a) it is argued that the additional resources generated by price stabilization can be channelled by governmental action into investment programmes designed to stimulate economic diversification. In response to (c) it can be argued validly that stabilization should lead to a minor reduction of inflation, as a result of the pricing policy pursued by most firms. A cost-plus system of pricing combined with a "ratchet" effect (in which higher raw material prices raise final product prices, but lower material prices do not result in lower product prices) ensures that sharp increases in commodity prices are more likely to increase inflationary pressure than the gentler rise associated with a stable price regime.

1.6 Views on the nature and causes of instability

Whatever view is taken of the need for price or earnings stabilization, it is far more widely accepted that price instability represents a major hindrance to steady and rapid economic growth in the LDCs. As McNicol (1978) notes there are several ways in which

this can happen: by preventing the formulation and execution of rational economic plans - an important factor in most LDCs where government expenditure and associated plans represent an extremely important part of the development process. Perhaps more significant would be the impact which a decline in the price of a dominant export commodity would have on the level of economic activity in the form of declining export earnings, lower imports of industrial inputs, falling production and employment and consequent contraction through the usual multiplier effects. Thus the effect of a fall in commodity prices could be at least as severe as a major depression in an industrialized country. The degree of the effect of instability on development is more contentious than the effect itself and McNicol quotes several studies which suggest some, but by no means overwhelming, evidence that there is a negative correlation between economic performance and instability in export earnings.

Price instability is not the only source of fluctuation in export earnings. Thus in a study covering the period 1948 to 1958 Coppock (1962) found that the volume of individual countries exports was the most volatile of the variables studied, for a range of internationally traded goods which included both manufactured and primary commodities. Indeed this study suggested that earnings from manufactured goods were more unstable than those from primary commodities, although this pattern concealed the greatest variability in base metal exports, and least in agricultural raw materials. There are, however, some shortcomings in the statistical measures and in Coppock's study. It did not take account of real prices, and did

not differentiate between increases and decreases, so that a manufactured good whose price was increasing rapidly for several years would appear as unstable as a primary good whose price fluctuated around a constant mean in current terms, even though the latter would represent a decline in real terms. In Chapter 4 an extensive survey is made of measures of instability, and an attempt is made to devise an alternative measure.

Instability has, thus far, been discussed in fairly general terms without defining accurately what the concept actually means. The International Monetary Fund's concept used in its "stabilization" programmes in member countries appears to be confined to instability in prices (inflation), monetary indicators and the balance of payments. Similarly, one World Bank view is that instability is essentially a foreign source liquidity problem, caused either by the loss of foreign exchange earnings or unbalanced growth in foreign expenditure (World Bank, 1979, page 30). Cole (1976) is critical of this fairly narrow approach to the definition of instability in LDCs and suggests that the reason that "real" economic objectives, such as employment and output, are omitted is that statistics on these variables are not sufficiently accurate nor are they produced frequently and promptly enough to be used as performance criteria in stabilization programmes. However, Cole, having criticized this approach, appears to fall into exactly the same trap so that his detailed discussion is confined to indicators of prices and the balance of payments. Thus the wide range of policy measures, including monetary and fiscal policy, exchange rate manipulation and wage

adjustment, which he advocates, do not seem to be directed at achieving steady growth of full employment. Stabilization in this context may be viewed as a necessary, but by no means sufficient, condition for the achievement of sustained economic growth. It may also be argued validly that the achievement of short-term stabilization is in certain circumstances inimical to the correction of the underlying structural imbalances which in many cases are the root cause of temporary or recurrent crises of instability. Any definition of instability must be cast in the context of the economic objectives of the country or institutions concerned. Thus it is that the IMF with its objective of ensuring internationally stable trading conditions, and crisis-ridden member countries whose aspirations are to raise output and employment levels, frequently come into conflict over the content of stabilization programmes. (10)

If stabilization policies must be tailored to the circumstances of individual countries, it is also essential that they should be appropriate for the prevailing global economic "climate". Thus the 1970's and early 1980's were characterized by falling growth rates, rising inflation and large redistributions of external financing balances. Countries were affected in a variety of ways and the range of responses is reflected in this extract from the World Bank's World Development Report, 1981.

"In general terms industrial countries increased their exports to the capital-surplus countries and slowed down their growth. Middle income countries borrowed heavily in the capital markets; some also increased their export penetration of industrial country markets. Some low-income countries were helped by good

crops, and more aid and workers' remittances. But African countries especially were beset by domestic problems and could neither increase their exports nor borrow much; they had to cut imports and endure stagnation." (World Bank, 1981, page 64).

The responses implied here amount to more fundamental changes in most economies than would normally be implied by stabilization programmes. Thus it would seem more appropriate to use the more recently popular term "structural adjustment" to describe the policies which are needed (11). In this case it is possible to regard orthodox stabilization policies as a special case of the more general class of structural adjustment policies, and a case which is open to some criticism when applied to economies faced with the risk of stagnation or contraction caused by external factors.

A particularly valuable contribution to the debate on stabilization policy has been made by the publication of the proceedings of a conference on the theme - see Cline and Weintraub (1981) - with useful supporting analysis of the causes of world inflation and its effects on the developing countries in a separate volume by Cline and associates (1981). Outstanding among the contributions is the theoretical analysis by Taylor (1981) of the possible consequences of introducing domestic stabilization policies in an economy subject to other (external) constraints. The importance of this analysis is accentuated by Black's conclusion that "although external factors have generated many of the disturbances to which developing countries have had to respond in the 1970's, it appears to have been largely country characteristics and the internal

response to those disturbances that have spelled success or failure for stabilization policy" (Black, 1981, p. 70). A balanced economic structure and the adoption of appropriate domestic policies are, therefore, crucial in this matter.

Taylor's (1981) analysis is developed from the familiar IS/LM framework. By conducting the analysis in three dimensional space, and by relaxing some of the more rigid assumptions of the basic IS/LM model, he shows that orthodox neo-classical or monetarist policies can be destabilizing, particularly in the case of "contractionary devaluation", an end which is the opposite of that intended. The basic IS/LM model is represented in two dimensions as the behaviour of the investment-saving balance and the demand for money with respect to "the" interest rate, i , and the level of output, X (12), Taylor's analysis introduces a new variable, the price level, P ; thus in addition to the i - X plane of the basic model, discussion may proceed in two further planes, i - P and P - X .

Taylor's argument depends critically on at least one way in which the "real" world may differ from the assumptions of standard formulations of the IS/LM model. This is that the price level may not be independent of interest rates, since the latter represents an important cost of production, i.e., the cost of working capital. While this may be a valuable contribution in modelling economies with high inflation and interest rates, as well as a well developed financial infrastructure, such as several developing countries in Central and South America, it is of limited value for the Zambian economy where interest rates have remained static or inflexible with

respect to changing economic conditions (see Chapter 8) and financial intermediation is rudimentary. Thus no causal relationship could be expected between interest rates and prices in Zambia, and the three-dimensional approach used by Taylor might not provide a valid representation of the Zambian economy. Therefore, Taylors' detailed analysis is not pursued in this thesis, although several of his conclusions, remain valid.

One particular feature of Taylor's analysis is felt to be particularly relevant to a country like Zambia where high export concentration is combined with an externally determined export price. In such an economy export volume is unlikely to be sensitive to devaluation since the foreign currency price of exports will not be affected in any way (e.g., copper is sold on the London Metal Exchange in sterling contracts with no reference to the currency of producing countries). Here it is plausible to suggest that a devaluation might lead to an increase in the external trade deficit expressed in real terms (i.e., with respect to constant domestic prices), that is, if export volume does not increase and import volume is inelastic with respect to price. This can be seen from the following relationship in which the real trade balance expressed in domestic prices, B, is given by:

$$\begin{aligned}
 B &= \frac{eP_m M}{P} - \frac{eP_e E}{P} \\
 &= \frac{e}{P} (P_m M - P_e E)
 \end{aligned}$$

Where e is the exchange rate in currency units per unit of foreign currency
 P_m , P_e are the foreign currency prices of imports and exports
 M , E are the volume of imports and exports
 P is the domestic price level

If export volume remains wholly unaffected by devaluation (P_m and P_e remain constant by definition) then a devaluation will reduce the real trade balance only if imports fall sufficiently. (It can be shown (13) that a 100α devaluation will lead to a reduction in the real balance if imports fall by $100 \frac{1}{1-\alpha}$ per cent - e.g., a 10 per cent devaluation would require a fall in imports of greater than 11.1 per cent to achieve a reduction in the real balance). This decline in imports is rendered smaller if export volume rises, or the domestic price level, P , rises in response to increasing import prices (expressed in domestic currency).

Thus it is possible for devaluation to increase the real trade deficit. This is equivalent to an increase in imported savings (see Appendix I.1) and so total saving also rises. It is this circumstance which leads to the effect which Taylor calls "contractionary devaluation", since he argues that higher saving will lead to a reduction of output. This result can be valid only if a Keynesian multiplier exists: rising saving implies a higher marginal propensity to save, of lower marginal propensity to consume, and this in turn means a lower multiplier which, for a given level of investment causes output to fall.

Although some doubt has been cast (in the preceding paragraphs) on one of the relationships on which Taylor's analysis was based, and reservations may be expressed on the multiplier effect (14), it is useful to note some of the conclusions he reaches concerning the application of orthodox stabilization policy (15) in an economy where conditions leading to "contractionary devaluation" exist.

Stabilization packages normally have one or more of the following elements:

- monetary restraint: the control of interest rates or restricting credit expansion;
- fiscal restraint: reductions in government expenditure;
- devaluation.

Taylor shows that under conditions described above and depending on certain structural features, these variants of economic policy can produce perverse results. For instance he shows that monetary restraint might lead to simultaneous rises in the price level and output, and that these variables would both fall if fiscal restraint is applied, while devaluation is shown to reduce output and raise the price level (16).

Despite the reservations stated it is felt that the analysis leaves considerable doubt about the efficacy of orthodox stabilization policies in some cases. Certainly the contractionary devaluation case appears plausible for Zambia - it will be seen in Chapter 7 and Appendix XI.1 that imports are inelastic with respect to changes in their price, while the price of almost all its exports (copper and other minerals) are determined exogenously, and so devaluation will have a negligible impact on export volume.

Stabilization policy may be counterproductive - the preceding discussion provides a priori reasons why this might be so. The conclusion regarding policy is that measures should be designed to correct the underlying structural defects which allow externally generated shocks to have such severe repercussions on the domestic

economy, rather than simply the symptoms such as inflation and balance of payments difficulties. The key phrase becomes "structural adjustment" and this topic will be taken up in the final chapter.

Some of the components which such policies should include are:

- (i) export earnings and the balance of payments (both current and capital accounts);
- (ii) government revenue receipts, expenditure and the fiscal balance;
- (iii) the earnings of the producers (i.e., the individual enterprises) of the export commodity;
- (iv) the growth of output and employment;
- (v) the stabilization of domestic prices and incomes;
- (vi) the control of monetary or credit aggregates;
- (vii) income redistribution.

More specifically the policies advocated might include export promotion, raising productivity in the agricultural sector, and using various economic incentives to direct people and investment into priority areas. More radically, as Taylor suggests, a country might "close the economy, run production from the centre, and force the income distribution toward equality via supply control and rationing" (Taylor (1981, p. 502)). However the World Bank suggests that it is countries which have decided to "adopt a more outward-oriented stance, to make products in which the country has a comparative advantage and to allow imports to compete with all but a limited

range of domestic goods" (World Bank 1981, p. 75) which have adjusted most successfully.

In the final analysis the policies must be designed with regard to the specific circumstances, existing institutions and economic structure of the individual country.

1.7 Debt accumulation and the role of the IMF

It is widely accepted that a current account deficit is an inevitable concomitant on the development process. Thus if a developing country is to avoid a balance of payments crisis it must maintain a steady net inflow on capital account, which can come only from one of two broad categories, direct foreign investment and foreign borrowing, although there is no unanimity on the optimal balance between the two, nor on whether they are equally desirable. For instance Dolan and Tomlin (1980) suggest that direct foreign investment is related to decreases in rates of economic growth, and that both "aid" and foreign trade appear to show only limited contributions to the growth process. In short they suggest that foreign linkages have only a minimal impact on economic development; thus we have another variant of those schools of thought which suggest that the principal impact on an economy, whether in terms of growth or destabilization, comes from within the country rather than outside.

A more common position is that external borrowing, efficiently managed, makes a positive contribution to growth. A comprehensive earlier statement of this appears in Avramovic (1964, Introduction)

who argues that the level of debt outstanding, and the associated debt service burden, will rise initially and then fall over a 25-30 year period: capital accumulation is financed first by external debt and later by domestic savings as the development process becomes self-sustaining. Avramovic's position was put forward to allay fears that a large number of LDCs would run into serious debt service problems and he attempted to show that this would simply be a temporary feature of long-run development. However, Avramovic's conclusions appear to have been based upon the past experience of selected developed countries, despite considerable evidence to suggest that there are major structural differences between the LDCs today and the more advanced industrial nations at an earlier stage, say one hundred years ago.

Nevertheless, Avramovic defined certain fairly tight conditions under which external lending to LDCs would be successful, including: the willingness of creditors to roll-over loans despite apparently increasing debt service burdens; that some means would be found to help the borrower over the worst "bunching" which would occur at the period of maximum accumulation; that fluctuations in export earnings would have to be substantially reduced; that the rate of return on capital would be markedly higher than the international rate of interest; and that there would be sufficient "plough-back" to enable growth to become self-sustaining (a situation he defines as growth financed from domestic savings plus voluntary foreign capital inflow). Thus Avramovic correctly anticipated that unless the growth of external

debt were correctly managed and export earnings followed an orderly pattern then acute debt servicing problems might arise.

In another part of the same study Hayes (1964) was to note that if interest rates were to rise to around 5 or 6 per cent then countries' indebtedness might grow indefinitely, particularly if the country concerned had a low domestic savings ratio or a particularly high incremental capital output ratio.

The discussions by Hayes, Avramovic and others represented only contributions in a debate which has become even more pertinent in recent years, i.e., how to predict whether a country is likely to experience debt servicing problems, and the related issue of how to appraise fairly and reliably a country's creditworthiness. The simple use of the debt service ratio (17) is not entirely satisfactory, as many writers have noted (e.g., Avramovic (1964), Dhonte (1975) and 1979), and Friedman (1978)). Avramovic notes many reservations but does not propose any satisfactory alternative, although he cites the evidence of Mikesell (1962) who found that a high debt service ratio (in excess of 40 per cent in many cases) did not necessarily precede default, nor did a low ratio prevent default on payments (18). Friedman (1978) approaches the problem from the point of view of a commercial bank, emphasizing the role of judgement and subjective appraisal in assessing risk. Dhonte on the other hand applies ten different ratios relating such variables as exports, GDP, debt service, debt outstanding and loan disbursement, but does not unequivocally support any one or group as a mean of identifying those

countries where debt servicing is likely to become a problem.

The general conclusion would be that most of the ratios might have some utility but that considerable discretion would have to be used in each country as it is studied.

There is little doubt that external indebtedness has come to be a more universal problem among LDCs in recent years, although whether this is true in the sense of general debt servicing difficulties is not so clear, at least in part because of the ambiguity of many formal measures noted above. As Beim (1977), Cleveland and Brittain (1977), and Dhonte (1979) all suggest this has a considerable amount to do with the escalation of oil prices after 1973. Hallwood (1980) goes further and suggests that the non-oil producing developing countries as a group have not experienced a deterioration in their external positions because of any internal economic mismanagement but rather as a result of external economic factors, notably oil prices and fluctuations in prices on international commodity markets. Hallwood suggests that rises in the prices of the manufactured exports of the industrial countries have not been a fundamental contributory factor. Abbott (1979), while recognizing the impact of the oil price revolution appears to argue that the accumulation of debt is a result of more fundamental factors: the need for capital flows for development and the inability of the borrowers to generate resources quickly enough to service previous loans, given the terms on which they are granted.

Dhonte reports that in the period 1972-76 total debt outstanding on the non-oil producing LDCs increased by a total of 117 per cent, while debt service registered an increase of 104 per cent. Interest rates have shown a tendency to increase since the 1960's. Thus according to Dhonte's calculations, while normal interest rates rose from 4.0 per cent in 1966 to 6.8 per cent in 1976 (respectively the minimum and maximum for the period), the "real" interest rate (19) which was 2.1 per cent in 1965 fell back during the early 1970's to negative levels (the minimum was -16.1 per cent in 1974) due to the increase in world inflation. However by 1976 the real interest rate had risen to 6.8 per cent. Also amortization has become more of a burden in the medium term. Total repayments scheduled over the next six years, expressed as a percentage of the debt currently outstanding, rose from 56.2 per cent in 1969 to 68.4 per cent in 1976 (Dhonte's figures being based on 80 and 96 countries respectively).

There is a further difficulty with attempting to study LDC debt as a global problem with a universally applicable series of solutions. This arises from the very substantial differences which can occur within the group of countries usually categorized as "developing". Thus on the one hand there are small, low income countries with few natural resources, such as Bhutan or Rwanda, and on the other relatively advanced, middle income countries frequently with substantial natural resources such as Brazil, Mexico or Israel. The problem is well illustrated by statistics taken from Dhonte (1979) in which he finds that there are seven heavy debtors (20) out of a total of 84 LDCs studied, who hold over one-third

of all LDC outstanding debt, and over a half of the total owed to private creditors. These countries' outstanding debt also grew considerably more quickly than the average during the period 1972-76 (99 per cent as opposed to 65 per cent). This fact casts some light on the reluctance of the developed nations to consider universal debt rescheduling or write-offs in the context of the "North-South dialogue" and their preference for a country by country approach. It is also one of the reasons for the reluctance of these heavy borrowers to become involved in these discussions because of the threat to their creditworthiness in the eyes of their private creditors. Moreover it points to an important distinction between official and private creditors: the source of loans can make a substantial difference to both the terms and conditions and the relationship between the borrower and lender. The overall structure of the developing countries' indebtedness is further examined in Chapter 9.

The increased burden of repayment noted above may be due in part to the general hardening of terms in certain types of lending, even that from development finance institutions such as the World Bank, but it is probably in large part due to the increase in lending by commercial banks, who have been the main intermediary for the recycling of the financial surpluses of the oil producers. This has occurred because the multilateral aid agencies and the IMF have not been able to respond with sufficient speed and in sufficient volume to the massively increased current account deficits of the non-oil

LDCs. Moreover the increase in some IMF facilities has caused a large rise in service payments to the Fund itself, and evidence will be produced that it will probably be Zambia's most important single creditor in the 1980's. The extent to which these statements are true is explored in Chapter 9.

Thus such an institution as the IMF has increasingly become a financial source of last resort. A succinct and sympathetic summary of the IMF's role is provided by Cleveland and Brittain (1977), and is quoted at length.

"The IMF enters the picture when a country has trouble servicing its debt and difficulty in borrowing privately. When the problem is traceable to the debtor country's own macro-economic policies, the IMF may be able to persuade the government to adopt a stabilization program in return for a stand-by credit and the IMF's seal of approval.

A developing country should not be expected to slow its growth in order to damp its demand for imports and thereby improve its overall balance of payments. A persistent overall balance of payments deficit usually reflects not a high growth rate, but an overly expansive domestic policy and a high rate of inflation, in combination with a fixed or supported exchange rate. The trouble can be cured in either of two ways. On the one hand, the country can adopt a severely restrictive monetary policy. In that event there will be - temporarily at least - an adverse impact on economic growth and employment until domestic inflation slows down. On the other hand, the country can allow its exchange rate to depreciate while at the same time reining in its monetary policy gradually rather than abruptly. The falling exchange rate will eliminate the overall payments deficit. Domestic inflation will accelerate at first but will then slow down reflecting the gradual cut-back in monetary growth. Meanwhile, there will be little sacrifice of real growth and employment".

Although probably not intended as such this extract serves as a concise defense of the IMF's conventional policy when it is "invited" into a country experiencing external payments difficulties.

In an extensive and radical critique of the IMF's role in stabilization in the LDCs, Payer (1974) notes the fact that the Fund's fundamental terms of reference (embodied in its Articles of Agreement) require that its policies in any individual member country be subservient to the need to maintain international trading stability. Thus its policies tend to be concerned with short-term stabilization and the external position of the country rather than with its longer term domestic policy objectives such as growth, employment or income distribution. Payer also notes the extent to which the presence of the IMF and the imposition of its preferred policies can lead to the subversion of the normal social and political functions of the member country. Some of these issues will be examined more thoroughly at a later stage, but it is perhaps appropriate to end this introduction with a quotation from Payer:

"... Liberalization of exchange and import controls is the heart of each IMF stabilization programme, as required by its Articles of Agreement. All of the other components of the package: exchange rate adjustment, stabilization measures, and foreign aid financing of the deficit, are measures which are necessary to counteract the predictable adverse effect of liberalization on the balance of payments. All of them are necessary, in the sense that the absence of any one of them would necessitate a much more severe application of the others: if domestic anti-inflationary measures were not implemented, then the devaluation would have to be much sharper and/or a much larger amount of aid would be necessary to cover the deficit, and so with the other items *pari passu*. The system is logically interdependent and consistent with the basic aims of the Fund. Effective criticism of it must take into account not only its social, political, and development consequences, but those basic aims as well."

Most development literature tends to be written either on an a priori basis, or as a result of an attempt to identify broad patterns or similarities among developing countries using cross-

sectional data analysis. Such studies have been called into question on the grounds of the assumptions and statistical techniques which must be used. They are also of doubtful value because of the large variety of economic structures and institutions, social and cultural environments, and political regimes which exist among these countries. The following chapters represent an attempt to examine the recent experience of one country in the hope that, by a more detailed study of one individual economy, with appropriate comparative analyses, general insights may be gained of the process of development and of adjustment to externally generated instability or decline.

NOTES

1. See, for instance, MacBean (1966), Coppock (1962), Nappi (1977), Hallwood (1979), Goodwin and Mayall (1979), Adams and Klein (1978) and McNicol (1978).
2. The growth of the external indebtedness of the LDCs has been a recurring theme in successive Annual Reports of the World Bank and International Monetary Fund. The World Bank Annual Report 1980, reports a five-fold increase in medium- and long-term disbursed debt between 1970 and 1978 (year-end figures), and a six-fold increase in total debt service payments; and suggested that low income countries were particularly vulnerable to problems of external debt management. The IMF's Annual Report 1980 showed greater concern for these poorer countries for whom debt service was identified as a serious problem particularly in view of shortening maturities and higher interest charges. The World Bank (1979) also discusses the problems in greater detail, and more systematic analyses have been undertaken by Dhonte (1979), Abbott (1979), Payer (1974), Cleveland and Brittain (1977), Feder (1980), Friedman (1978) and Hallwood (1980); while Mikesell (1962), Hayes (1964) and Avramovic (1964) had anticipated many of the problems which might face developing countries.
3. For a fuller discussion of some of these characteristics see Todaro (1977), Thirlwall (1972).
4. The "dependency ratio" is defined as the proportion of the population which is not of working age.

5. Singer (1970) distinguishes four essential elements to economic dualism:
- (i) different conditions, some of which are superior and some inferior, coexist simultaneously;
 - (ii) the coexistence is chronic and is not simply a transitional feature;
 - (iii) the differences do not diminish over time, and may have a tendency to increase;
 - (iv) the existence of "superior" elements or conditions does not assist to improve the inferior set of conditions.

The concept can be applied internationally to describe inequity between nations as well as inequalities within individual countries.

6. In the Harrod-Domar model the warranted rate of growth, g , is related to s , the savings ratio (a financial relationship), and C , the incremental capital-output ratio (a technological relationship), by the well-known equation

$$g_w = \frac{s}{C}$$

Many criticisms of the approach have been made (for instance, summarized in Todaro (1977) and Thirlwall (1972)), but perhaps the most telling relate to the improper use of the relationship in attempting, not merely to explain, but to plan and stimulate long term growth. The model was developed to explain short to medium term cyclical variations in relatively advanced economies (see Harrod (1939) and Sen (1970, Reading 1)), not growth in LDCs. Moreover, it incorporated two other growth rates (with no necessity of equality among the three), yet the temptation exists for planners simply to use the relationship,

$$g = \frac{s}{C}$$

taking cognisance neither of other constraints nor of the need to distinguish ex post and ex ante relationships.

7. It is noted that the International Monetary Fund, so often required to assist with stabilization programmes, implicitly remains committed to a view that instability is primarily due to domestic maladjustments.
8. The European Economic Community's agreement on trade and aid with associated African, Caribbean and Pacific states.

9. See Brook and Grilli (1977), cited by Nappi (1979). But see also Nguyem (1980) who argues that partial price stabilization will stabilize earnings in situations in which complete price stabilization measures fail.
10. For a critical appraisal of the role played by the IMF in LDCs see Payer (1974).
11. The variety of structural adjustment policies adopted by developing countries is a central theme of the 1981 World Development Report (World Bank, 1981, especially Chapter 6).
12. The basic IS/LM model is outlined in macro-economic textbooks, e.g., Dernberg and McDougall (1968), Brooman (1970), Crouch (1972), Pierce and Shaw (1974).
13. Based on equation 1.1 real trade balance before and after a devaluation are distinguished by subscripts 0 and 1 respectively,

$$B_0 = \frac{e_0}{P} (P_m M_0 - P_e E) \quad (1.2)$$

$$B_1 = \frac{e_1}{P} (P_m M_1 - P_e E) \quad (1.3)$$

assuming no change in export volume, E . The exchange rate, e_0 , is expressed in units of domestic currency, D , per unit of foreign currency (say U.S. dollars), i.e.,

$$e_0 D = \$1 \quad (1.4)$$

After devaluation of 100α per cent the same number of units, $e_0 D$, will purchase, $\$(1-\alpha)$, i.e.,

$$e_0 D = \$(1-\alpha) \quad (1.4a)$$

Thus the new exchangerate, e_1 , may be derived by rearrangement of (1.4a)

$$e_1 D = \frac{e_0}{1-\alpha} \$$$

$$\text{i.e., } e_1 = \frac{e_0}{1-\alpha} \quad (1.4b)$$

Substituting (1.4b) in (1.3) and rearranging it is easily shown that the trade balance after devaluation, B_1 , is less than that before, B_0 , only if

$$M_1 < \frac{1}{1-\alpha} M_0$$

14. The multiplier effect may be questioned in a developing country. It is, as elsewhere, dependent on the exact form of the consumption function (e.g., on the level of autonomous consumption). It is also less clear that investment of all types will lead immediately to higher output - large infrastructural projects have an unpredictable effect. Moreover, the level of capacity utilization may vary substantially (e.g., as a result of a foreign exchange constraint).
15. See Chapter 11 for fuller discussion of stabilization policy.
16. It is stressed that these results are derived from a variant of the IS/LM model which has not been developed here.
17. The "debt service ratio" is total debt service (interest plus amortization) divided by total exports of goods and services.
18. The evidence in this case related to countries such as Canada, Australia and Argentina in the late nineteenth and early twentieth centuries.
19. Dhonte defines his data series as follows (symbols introduced by present author):
 - (i) nominal interest rate - average rate on new commitments to developing countries (i_n);
 - (ii) price deflator - change in the U.S. dollar unit value index for exports of industrial countries (Δp_e);
 - (iii) real interest rate - "ratio of the above two rates" (i_r).

However it proved impossible to reproduce Dhonte's real interest rate calculations. For instance in 1974, $i_n = 6.4\%$, $\Delta p_e = 23.6\%$ and $i_r = -16.1\%$. The most plausible interpretation of (iii) above would be:

$$1 + i_r = \frac{1 + i_n}{1 + \Delta p_e} \quad \text{which for 1974 would give } i_r = -13.9\%.$$

An alternative measure would be

$$i_r = i_n - \Delta p_e \quad (= -17.2\% \text{ in 1974})$$

Despite this apparent inaccuracy, the overall conclusion stands.

20. Algeria, Argentina, Brazil, Iran, Mexico, South Korea, Turkey.

CHAPTER 2 ECONOMIC INSTABILITY AND THE EMERGENCE OF FINANCIAL CONSTRAINTS

2.1 Introduction

Zambia, formerly Northern Rhodesia, was unusual among less developed countries in that it gained independence in 1964 with an economy which despite many other limitations was not significantly restrained by the availability of financial resources. The existence of other constraints was recognized in the 1960's as will be discussed later in this chapter, and their presence perhaps served to do no more than delay the arrival of financial constraints. The point may be viewed as the familiar concept of constrained maximization frequently encountered in many branches of economic theory, so that, for instance, in a standard programming problem some constraints are inoperative in a feasible or optimal solution. Thus in the early years of Independence the constraint imposed by either external or internal finance was not significant. This chapter will examine this in further detail, after a discussion in the pre-Independence economy and an initial consideration of the evidence of instability in the economy.

2.2 Historical and political developments

The region of Africa now known as Zambia came to relatively general European interest in the mid-nineteenth century with the "exploration" by David Livingstone, and systematic accounts of the region's history do not precede these visits. But it is known that

other European (notably Portuguese) and Arab traders (including slave-traders) had been visiting the country for many years before the Livingstone "discovery". The indigenous population was marked by considerable economic, social and cultural diversity, and in some parts of the country fairly well developed economic systems had evolved, particularly in the Western part of the country among the Barotse people (1).

In 1890 the British South Africa Company began the administration of Barotseland (or North-western Rhodesia), while the latter became a British protectorate, in return for the granting of mining and other commercial concessions to the Company. The company gained administrative control over the rest of present-day Zambia (the eastern half of the country then known as North-eastern Rhodesia passed into the direct control of the British government. In subsequent years, and particularly after 1945, as the European population of these Central African territories increased, there came increasing pressure for some form of amalgamation between Northern and Southern Rhodesia. Thus, in 1953 was established the Central African Federation, consisting of Southern Rhodesia (now Zimbabwe), Northern Rhodesia (now Zambia) and Nyasaland (now Malawi). The Federation remained in existence for about ten years with final dissolution in 1963, although considerable African resistance to the Federation and the growing liberation movements had rendered it increasingly ineffectual in its latter years (2).

After a very brief period (from January 1964) of internal self-government under the premiership of Kenneth Kaunda, who was to become

the President of the new Commonwealth republic, Zambia became independent on United Nations Day (24 October) 1964. Dr. Kaunda's party, the United National Independence Party (UNIP) was dominant in the National Assembly, winning 81 of 105 seats in the 1968 general election. But there were other political parties and the African National Congress (ANC) won 23 of the seats in the same election. It was not until December 1973 that the National Assembly reconstituted Zambia as a one-party democracy.

Zambia's post-independence history (3) has been frequently and heavily influenced by political problems in and "conflict" with many of its neighbouring states: Zaire, Angola, Mozambique, Namibia (South-west Africa) and, by far the most significant, the unilateral declaration of independence (UDI) by (Southern) Rhodesia in 1965. As regards the latter the imposition of sanctions by the United Nations against the illegal government in Rhodesia, was largely supported by Zambia although it was not until 1973 that the border between the two countries was closed. The economic cost to Zambia of these sanctions was very high, and it was the severe disruption of its transport routes which was to lead the Zambian government to allow a partial reopening of the border in 1978. The return to legality and Independence of Zimbabwe in 1980 has helped to remove at least a part of the political instability from Zambia's borders, although at the time of writing the question of Namibia's future remained unsolved, and tensions existed along that border.

2.3 The economy before 1965

Before the arrival of European settlers and commercial interests, Zambia was essentially a traditional or subsistence farming economy. Trade was limited, and any form of manufacturing would have consisted perhaps of the production of artefacts from the small amounts of copper and other minerals which could be found without intensive mining operations. In his extensive survey of the period from 1920 to 1960, Baldwin (1966) traces the initiation of intensive mining operations in Northern Rhodesia to 1925, and it is perhaps from this date that the development of a "modern" or industrialized sector may be said to have begun. Certainly Baldwin shows that copper production increased very rapidly, starting from 1,000 tons in 1926 to 138,000 tons by 1934, and 213,000 tons in 1938 immediately before the second World War, by which time Northern Rhodesia's share in world copper production had risen to over 13 per cent. Although the country's share was to rise slightly above this level during the 1950's, by the beginning of the 1970's the share had fallen to about 10.5 per cent, from which level it has continued to decline. Thus in the first eight years of mining operations in Northern Rhodesia the country obtained a relative importance in terms of international trade in copper that it was to prove unable to sustain.

Despite the lack of continued growth in its relative share of world production, the absolute level of production rose significantly in the post war years, as Table 2.1 shows, and mining activity became

Table 2.1 Copper production in and exports from Zambia, 1926-1964

	Thousand tonnes			Exports	Percentage of total production refined in Zambia
	Production		Total		
	Blister (a)	Refined (b)			
1926	--	--	1	--	--
1930	--	--	6	--	--
1934	--	--	141	--	--
1938	--	--	217	--	--
1942	--	--	251	--	--
1946	--	--	185	--	--
1950	--	--	280	--	--
1954	208	176	385	389	45.7
1955	168	180	348	348	51.7
1956	160	280	390	374	59.0
1957	172	251	423	415	59.3
1958	135	245	380	409	64.5
1959	168	370	539	521	68.6
1960	164	402	567	557	70.9
1961	151	416	567	545	73.4
1962	113	433	547	531	79.2
1963	137	439	576	574	76.2
1964	145	497	642	681	77.4

Millions of Kwacha

	Value of production	Value of exports
1954	173.1	173.0
1955	222.7	221.2
1956	229.3	227.6
1957	157.3	165.0
1958	123.4	135.4
1959	222.8	214.4
1960	241.8	239.2
1961	229.3	220.2
1962	224.4	217.6
1963	236.0	235.2
1964	279.9	296.8

Sources: 1926-50 Baldwin (1966) - Table 2.2.
 1950-64 Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office, June 1965 (Table 22, page 16 - export data; Table 32, page 32 - production data).

- (a) See Appendix V.1 for full explanation of these terms.
- (b) Converted to metric tonnes from short tons.
- (c) Converted to Kwachas from Zambian pounds at rate of £Z1 = K2.

the central feature of the economy. Its importance may be seen in three broad areas to which repeated reference will be made in many subsequent chapters: firstly, mineral production came to account for a very substantial proportion of total value added in the country; secondly, mineral exports represented the major part of the country's foreign exchange earnings; and thirdly, the fiscal revenue yielded by the mining operations constituted a significant proportion of the government's total revenue receipts.

Table 2.2A shows the composition of gross domestic product by kind of economic activity, and it is immediately seen how large a proportion was produced by the mining sector: in the period 1955-64 the mining sector accounted for an average (4) of 49.4 per cent of GDP at current prices (5). It is noted without further comment at this stage that there is substantial variation from year to year in the share of mining activity, caused more by variations in the realized prices of copper sales than in either the cost or volume of production. The agricultural and industrial sectors show remarkably little change over these ten years, with annual variations apparently due more to changes in the contribution of mining than to any sectoral characteristics. The figures for agriculture include both "African" and "Non-African" agriculture, the former of which may be taken to consist almost entirely of subsistence farming which would therefore grow approximately at the rate of rural population. "Non-African" agriculture would be roughly analogous to what is now termed "commercial agriculture" in the Zambian national accounts, and its share of GDP rose from 1.2 per cent in 1955 to 2.7 per cent in

Table 2.2A Gross domestic product in current market prices
by kind of economic activity, 1955-64

a. Nominal values (millions of pound)

	Agriculture (a)	Mining	Other industry (b)	Services (c)	Total GDP
1955	15.7	102.9	18.0	32.6	169.2
1956	18.5	108.2	23.4	37.6	187.7
1957	20.0	67.8	25.2	41.7	154.7
1958	18.7	52.6	26.1	43.2	140.6
1959	22.3	92.4	23.7	49.1	187.5
1960	22.7	107.3	22.6	54.0	206.6
1961	24.4	97.3	23.0	55.0	199.7
1962	23.3	94.0	22.3	57.4	197.0
1963	25.8	96.4	24.5	59.8	206.5
1964	27.3	119.8	27.6	65.2	239.9

b. Proportionate structure (percentages)

1955	9.3	60.8	10.6	19.3	100.0
1956	9.9	57.6	12.5	20.0	100.0
1957	12.9	43.8	16.3	26.9	100.0
1958	13.3	37.4	18.6	30.7	100.0
1959	11.9	49.3	12.6	26.2	100.0
1960	11.0	51.9	10.9	26.1	100.0
1961	12.2	48.7	11.5	27.5	100.0
1962	11.8	47.7	11.3	29.1	100.0
1963	12.5	46.7	11.9	29.0	100.0
1964	11.4	49.9	11.5	27.2	100.0

Sources: Republic of Zambia, Monthly Digest of Statistics,
Lusaka: Central Statistical Office, June 1965 (Table 49, page 39).

- (a) Includes "African" and "Non-African" agriculture.
 (b) Manufacturing, construction, electricity and water.
 (c) Distribution and transport, financial and business services,
 public administration, personal services.

Table 2.2B Gross domestic product at 1954 market prices,
with trend growth rates, 1955-64 (a)

a. Gross domestic product at 1954 market prices (millions of pounds)

1954	136.9
1955	136.5
1956	149.6
1957	156.2
1958	152.1
1959	183.8
1960	197.8
1961	198.1
1962	196.1
1963	200.3
1964	227.0

b. Annual average growth rates of GDP (percentages) (b)

1954-64	5.2
1954-59	5.4
1959-64	3.1

Sources: 1955-64: Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office, June 1965 (Table 49, page 39).

1954: Republic of Zambia, National Accounts 1964-65 and Input-Output Table, 1965, Lusaka: Central Statistical Office (Table 2, page 2).

(a) Exponential trend rate of change.

1964. Most of the non-african agricultural activity developed around what came to be called the "line of rail" running from the border with Southern Rhodesia at Livingstone, through Lusaka, and northwards to the centre of mining activity in the northern towns of the Copperbelt, a pattern which has persisted with only moderate changes up to the 1970's. This activity was conducted almost exclusively by European settlers and the "line of rail" became the centre of most white immigration.

The relatively static level of manufacturing activity relative to total GDP has been attributed to various influences. Both Young (1973) and the United Nations (ECA/FAO) report (1964) - the "Seers Report" - suggest that the Federal government's policy concerning industry encouraged development in Southern Rhodesia only, little being done to stimulate domestic production in the North. For instance, Young suggests that the establishment of a Federal customs union which excluded South Africa, merely served to divert Northern Rhodesia's sources of imports to Southern Rhodesia without providing any countervailing incentive to investment in the North. Thus the Federal government did little to reverse the pre-federal industrial climate which Young characterizes as "laissez-faire". In such a climate industrial investment was naturally attracted to Southern Rhodesia where there was a much higher degree of infrastructural development, of industrial diversification, and a far larger market for both consumer goods and capital and intermediate inputs to domestic industry. A further obstacle to industrial development in

Northern Rhodesia was created in several ways by the presence of the mining industry. Its relative sophistication meant that it had to import the large majority of its inputs; thus for instance Baldwin (1966) estimates that even by 1960 only between 15 and 20 per cent of its operational stores were supplied by domestic industry, and if this is the case then an even smaller proportion of its capital equipment would have been locally available. Thus the inter-industry linkages which are essential to balanced economic growth were slow to develop. To compound this, the ready availability of foreign exchange meant that there was no incentive or necessity to satisfy the demand for consumer goods (both durable and non-durable) from domestic production.

The predominant role of the mining sector is further reflected in Table 2.3 which provides analysis of GDP by type of final expenditure. The extreme "openness" of the economy suggested by some observations in the previous paragraph is emphasized by the astonishingly high ratio of exports to GDP which averaged 82.8 per cent between 1945 and 1953. By 1965 this ratio had fallen to about 51 per cent, reflecting the gradual growth of the proportionate share of domestic final expenditure (6). Nevertheless, as will be noted at a later stage, the share of exports in GDP remains very much higher in Zambia than in most other countries, with a proportionate level of 45.2 per cent in 1979. Although certain components of GDP show substantial variation from one year to another, there is a medium term stability about private consumption which was less pronounced in the years following 1965. Thus the average level of

Table 2.3 Structure of gross domestic product by type of expenditure
in current market prices, 1945-64

Expenditure category (percentages) (a)						
	Private final consump- tion	Government final consump- tion	Gross capital formation (b)	Exports	Imports	Net exports
1945	56.5	8.4	10.4	83.1	59.7	23.4
1946	54.7	8.8	12.2	82.3	58.0	24.3
1947	45.0	7.6	15.8	87.1	49.3	37.8
1948	45.0	7.9	25.6	82.6	61.2	21.4
1949	43.5	8.4	27.3	79.0	60.8	18.2
1950	38.6	7.7	25.8	84.8	58.8	26.0
1951	34.6	6.9	22.5	86.7	52.3	34.5
1952	37.3	7.3	27.7	82.4	55.0	27.4
1953	44.2	8.1	25.8	76.8	56.7	20.1
1954	47.3	6.9	22.9	--	--	24.5
1955	44.1	6.7	24.9	--	--	24.3
1956	43.6	7.4	30.6	--	--	19.3
1957	57.1	10.5	40.6	--	--	-5.7
1958	61.8	12.0	24.0	--	--	2.9
1959	50.5	10.6	21.6	--	--	16.0
1960	48.1	10.1	23.7	--	--	18.0
1961	50.2	12.1	24.3	--	--	14.8
1962	52.4	13.3	22.7	--	--	12.0
1963	51.5	13.8	17.9	--	--	17.8
1964	49.9	11.8	11.4	--	--	28.0

Sources: Appendix S, Table S.1.0.

(a) Figures for 1954-64 may not add to 100 per cent since GDP total in Table S.1.0 includes statistical discrepancy.

(b) Includes "Increase in stocks".

private final consumption expenditure was 48.9 per cent in the period 1945-59, and 48.4 per cent in the five years 1960 to 1964. Also, while government final consumption rose gradually between 1945 and 1964, the increase is very modest when it is contrasted with its proportionate share after 1965. Gross investment (including stock-building) was, on the other hand, rather less stable in the years preceding Independence; and, although high by the standards of many other developing countries, was considerably lower than the post-1965 average.

The importance of mineral exports relative to the total has shown almost no change in the period since 1945. Baldwin (1966, page 36) quotes figures showing that between 1945 and 1953 copper accounted for 86.5 per cent of all exports, and that other minerals accounted for another 8.8 per cent. As will be shown at a later stage this proportion has, if anything, increased. Thus throughout most of the 1970's, copper alone accounted for over 90 per cent of total exports.

In 1945 the government derived about 38 per cent of its current revenue from the mining companies; by 1953 this figure had risen to nearly 57 per cent; and in 1964 the proportion received was still as high as 53 per cent, although the proportion showed considerable annual variation (7).

The consequences of this dependence on the mining industry in the years before 1965 are analyzed by Baldwin (1966) in terms of the emergence of a high degree of economic and social dualism

characterized by development in only a limited part of the country (the line of rail mentioned above), in such a way that a "modern, highly mechanized industry has been superimposed upon a rural backward economy..." and with the consequence that a "modern developed economy exists in the midst of a subsistence economy, apparently without stimulating development in the latter sector" (Baldwin, 1966, pages 40 and 41). He also suggests that Zambia dualistic pattern of development was different from that in many other developing nations in that, not only was the capital necessary for development imported, but so too was the highly skilled labour necessary to operate it. Thus he notes two population effects: a large inflow of (mainly European) settlers, and the commencement of the migration of Africans from the rural areas to the cities, in search of paid employment. According to Baldwin, further consequences included the development of a highly skewed and unequal income distribution, an education system heavily influenced by and biased towards the needs of European children, and a health service which for the major part of the African population was very rudimentary, particularly for those living in the rural areas.

Thus by the time of Independence in 1964, Zambia was marked by a fairly unbalanced economic and social structure, influenced primarily by the predominance of the copper mining industry, and the presence of a large European population which held effective control over large parts of the economy, and the administration of the government, as well as for many years having held a position of effective social superiority. Nevertheless the economic performance

in the years before independence had been fairly impressive as the data of Table 2.2 suggests, with a high rate of growth of GDP, although this had fallen off in the final years of the Federation. In the year of independence itself, 1964, real GDP rose over 13 per cent, caused by a combination of a rise in real output, as well as an improvement in the terms of trade. The prospects for future growth as forecasted, for instance by the United Nations (ECA/FAO) report (1964), appeared very favourable. The extent to which the apparent potential was realized is discussed in the following sections.

2.4 An international comparison of commodity dependence

Despite initially rapid growth in the years after 1965 and various attempts at diversification, Zambia remained an open economy which, with the exception of some major petroleum exporters, is the most heavily reliant of any less developed country on the export of a single commodity. Reference to Table 2.4 shows that in 1978 Zambia received 92.9 per cent of its export earnings from copper. The mean value for a single commodity as a proportion of non-oil producing LDC's exports was 42.3 per cent and the value of the median for this group was 38.7 per cent. It is also noted that only one other non-oil LDC relied for more than 90 per cent of its export earnings on one commodity: this was Uganda, where the proportion had been lower in earlier years.

Table 2.4 also shows that Zambia is an open economy in the sense that it derives a larger than average proportion of its GDP from

Table 2.4 Reliance on primary commodities - less developed countries, 1978 (a)

(Percentages)

	Mean	Standard deviation	Lower quartile	Median	Upper quartile
1. Proportion of export earnings from principal primary commodities (b):					
All LDCs (c) (n=83)	48.8	25.9	29.7	41.5	67.0
Non-oil LDCs (d) (n=67)	42.3	21.8	25.9	38.7	58.1
Zambia	92.9				
2. Exports as proportion of GDP (e):					
All LDCs (n=83)	29.6	21.8	17.5	24.4	37.5
Non-oil LDCs (n=67)	26.1	14.5	15.7	22.0	35.9
Industrial countries (n=18)	29.9	12.2	24.3	27.9	35.3
Zambia	34.0				
3. Countries earning more than 80 per cent of export earnings from one commodity:					
		<u>Proportion (%)</u>		<u>Commodity</u>	
Libya		99.9		Oil	
Saudi Arabia		99.8		Oil	
Iran		98.1		Oil	
Iraq		98.1		Oil	
Venezuela		95.1		Oil	
Zambia		92.9		Copper	
Algeria		91.7		Oil	
Trinidad and Tobago		91.2		Oil	
Kuwait		90.5		Oil	
Nigeria		90.2		Oil	
Uganda		90.2		Coffee	
Burundi		85.9		Coffee	
Somalia		85.0		Live animals	
4. Other major copper exporters: share of copper in export earnings:					
Chile		49.9			
Zaire		41.5			
Papua New Guinea		39.5			
Peru		20.9			

Source: Calculated from data in International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington: International Monetary Fund.

(a) Except as stated.

(b) Unweighted averages of single most important primary commodity expressed as a proportion of total merchandise exports; year, 1978 except India and Niger (1976), and Colombia, Congo, Ghana, Senegal, Yemen Arab Republic and Yemen People's Democratic Republic (1977).

(c) Following classification used by World Bank in World Development Report, 1979; includes only countries with population over 1 million.

(d) Excludes oil-exporting LDCs, i.e., those whose largest single export is oil.

(e) Exports and GDP in current prices in national currency units.

exports, although the contrast with other non-oil producing LDCs is not as striking as the extent of single commodity export concentration. In 1978 Zambia derived 34.0 per cent of its GDP from exports, compared with a mean of 26.1 per cent for all non-oil producing LDCs and 29.9 per cent for the industrialized countries. This is not an exceptionally high level, and Zambia's 1978 level is less than the upper quartile among all countries, both developing and industrialized. However, as Table 2.5 shows, the share of exports in GDP in 1978 was exceptionally low for Zambia and this ratio has shown marked variation over time, because of the effect of the volatility of copper prices on national accounting identities expressed at current prices. Thus the export to GDP ratio ranged between 34.0 and 65.7 per cent, with a mean value of 47.3 per cent (standard deviation 7.8 per cent) with even higher levels in the years before 1965. This variability not only suggests that Zambia's dependence on exports is greater than is shown in Table 2.4, but also that an such international comparison based on one year's data alone must be treated with caution, again because of the general instability through time of primary commodity prices (8).

Two points emerge from this brief analysis: firstly that Zambia has had a relatively high export earning potential, and can be expected to be less susceptible than most to the foreign exchange constraint which is characteristic of LDCs; and secondly that its dependence on a single commodity renders it more vulnerable than most to external influences, the most direct of which is the movement of world copper prices.

Table 2.5 Share of Copper in Merchandise Exports and
Share of Exports in GDP: Zambia, 1965-79

	Millions of U.S. dollars		Copper as a percentage of total exports	Millions of kwacha		Exports as a percentage of GDP
	Merchandise exports	Exports of copper		GDP	Exports (a)	
1965	380.3	343.2	90.2	711	373	52.5
1966	493.5	460.6	93.3	848	456	53.8
1967	470.0	434.0	92.3	957	475	49.6
1968	544.4	516.1	94.8	1062	545	51.3
1969	766.5	724.5	94.5	1314	863	65.7
1970	715.0	681.4	95.3	1269	685	54.0
1971	485.2	450.2	92.8	1181	501	42.4
1972	541.6	490.9	90.6	1338	586	43.8
1973	742.0	698.3	94.1	1588	781	49.2
1974	905.1	838.5	92.6	1893	944	49.9
1975	521.0	472.0	90.6	1583	575	36.3
1976	749.2	688.1	91.8	1941	832	42.9
1977	705.2	645.9	91.6	2024	788	38.9
1978	665.0	617.8	92.9	2259	768	34.0
1979	1,118.8	925.3	82.7	2566	1161	45.2

Source: Calculated from International Monetary Fund, International
Financial Statistics Yearbook, 1980.

(a) Exports of goods and services.



These two features of the Zambian economy are explored in this chapter and the next, by attempting to examine the degree of stability in appropriate economic variables and the extent to which there is evidence of structural imbalance in certain economic aggregates.

2.5 The general nature of instability in Zambia

The selected economic indicators in Tables 2.6 to 2.12 will be used to provide a preliminary indication of the nature of instability in Zambia. Many of the economic variables will be discussed at greater length in subsequent chapters, but it is felt to be useful to summarize and compare most of the leading economic indicators in an attempt to define the nature of the instability, if any, which has afflicted Zambia in the years from 1965 onwards. At this stage no attempt is made to quantify the instability, a task which will be undertaken in Chapters 4, 5 and 7.

2.5.1 The price of copper. Table 1.4 gave an indication both of the decline in commodity prices generally during the 1970's and of the particularly weak performance of copper prices relative to other commodities. Table 2.6 provides a further impression of the considerable variations which have occurred in copper prices expressed in current prices in the years from 1965. The average annual price actually declined in five of the fifteen years, with a fall of over 35 per cent in average prices in two instances. Actual daily prices can of course vary even more widely: for example, in 1974 the highest and lowest daily sterling quotations on the London Metal Exchange were £1400 and £529 respectively, a decline of 62.2 per cent.

Table 2.6 Selected economic indicators: Copper prices, 1965-80

	Index of London Metal Exchange sterling prices per tonne (1970 = 100)	Percentage change from previous year
1965	78.5	33.1
1966	92.7	18.0
1967	69.8	-24.8
1968	87.7	25.6
1969	104.0	18.6
1970	100.0	-3.8
1971	75.6	-24.4
1972	72.8	-3.7
1973	123.6	69.8
1974	149.1	20.6
1975	94.7	-36.5
1976	133.1	40.5
1977	127.6	-4.1
1978	120.9	-5.2
1979	159.3	31.8
1980	160.2	0.6

Source: Calculated from Appendix S, Table S.3.7

The effect of the instability of copper prices, their declining real values and the rapid increase in import prices, particularly during the 1970's, may be seen from the behaviour of the terms of trade in Table 2.8. During the period 1965-69 the terms of trade improved, with an overall increase of about 61 per cent. Thereafter the trend is reversed, so that by 1979 the terms of trade were over 40 per cent below their 1965 level. The movement of the terms of trade is not smooth, however; thus in 1966 and 1975 there were movements of over 50 per cent in one year. This form of instability is entirely externally induced: Zambia has control over neither import nor export prices.

2.5.2 Economic growth. In Table 2.7 some of the effects of this instability may be observed. The growth of Gross Domestic Product (GDP) as conventionally measured is extremely erratic, with very rapid growth in a few years being offset by equally large falls in other years. The trend growth rate for the period 1965-79 was about 2.0 per cent (9). During the period 1964 to 1979 the population is estimated to have grown at an annual average rate of 3.1 per cent (10), i.e., somewhat faster than the growth of GDP. The net result is an overall decline in per capita GDP of 23 per cent. The Zambian authorities now also prepare an estimate of GDP adjusted for movements in the terms of trade; the corresponding per capita GDP figure can therefore be taken to represent an indication of the real purchasing power of average income. The growth of per capita GDP adjusted for movements in the terms of trade shows an extremely erratic path, as may be seen from Table 2.7, with a maximum growth

Table 2.7 Selected economic indicators: Gross domestic product, savings and investment, 1965-79

	1970 prices			Current prices	
	Gross domestic product per capita (kwacha)	Annual growth rate of		Saving as a percentage of GDP	Investment as a percentage of GDP (a)
		Gross domestic product (total)	Per capita GDP adjusted for terms of trade (a)		
1965	323.4	...	...	25.7	20.1
1966	298.0	-5.6	8.7	28.5	23.6
1967	314.2	7.9	-1.8	25.3	27.0
1968	309.3	1.2	6.3	22.5	26.0
1969	300.3	-0.4	16.5	35.1	20.8
1970	306.4	4.8	-14.1	24.1	29.7
1971	296.0	-0.7	-16.2	8.5	33.1
1972	313.7	9.2	4.3	9.9	33.0
1973	290.8	-1.8	4.8	20.8	26.6
1974	305.2	8.3	1.1	25.6	26.5
1975	288.8	-2.4	-25.6	-4.4	38.0
1976	303.1	8.3	2.5	12.7	30.9
1977	280.9	-4.5	-13.4	9.9	33.0
1978	273.9	0.5	-3.4	6.4	24.4
1979	241.0	-9.0	-11.2	6.3	18.5

Source: Calculated from Appendix S, Tables S.1.1, S.1.2, S.1.3, S.1.7, S.2.2

(a) See explanation in Appendix III.2.

(b) Gross fixed capital formation.

rate of 16.5 per cent, and a minimum of -25.6 per cent; the geometric mean annual rate of growth was -3.6 per cent for the period 1965-79. For the shorter period 1974-79, per capita GDP (adjusted) fell at the (geometric) mean annual rate of 10.7 per cent, an overall decline of 43 per cent. This measure begins to provide an indication of the very large reduction which has taken place in real living standards, and also how vulnerable to external factors these standards are.

This poor growth record is not immediately explained by a lack of investment. The final column of Table 2.8 yields an average ratio of investment to GDP of 27.4 per cent, with some of the highest individual observations occurring in the most recent years when growth has been poorest. This compares favourably with other less developed countries: in 1978 the average investment to GDP ratio was 23.5 per cent in 86 LDCs (11). The explanation may lie in the fact that these figures are for gross rather than net fixed capital formation, and that the Zambian mining industry which accounts for a large proportion of total investment, has had to concentrate on the replacement of existing capital equipment rather than making net addition to its capital stock. This will be explored in a subsequent chapter, and was previously discussed in Bell (1981b, pp. 15-18).

2.5.3 Balance of payments (12) and international reserves.

In common with many LDCs Zambia ran a substantial balance of trade surplus, in each year since 1965 except 1975. However, the size of this surplus has shown large variation from year to year, due at least in part to fluctuations in the price of copper - a correlation

coefficient (R) of 0.626 was found between an index of copper prices (Table 2.6) and the balance of trade (Table 2.8). It also follows from the tendency of imports to respond to change in exports with a lag of about one year, so that, for instance, a rise in export receipts would tend to be followed a year later by an increase in the level of imports. This feature of the economy will be explored in greater detail in Chapter 7.

The slow but consistent rise in the level of net invisible payments has meant that the current account balance has followed a course almost parallel to that of the trade balance. The overall balance has generally moved in phase with the balances of trade and the current account but its movements have not followed the latter exactly.

These observations suggest that three major influences are responsible for instability in the balance of payments:

- firstly, the variability of export earnings;
- secondly, variations in the volume or value of imports; and
- thirdly, the unpredictable nature of movements in the capital account, with "capital flight" being an important factor, particularly in the early years of Independence, and a mounting level of debt amortization in more recent years.

The significance of the first factor is illustrated by the fact that the ratio of exports to GDP for the entire period showed an unweighted mean value of 47.3 per cent. The balance of payments is the variable most directly and immediately affected by instability on

Table 2.8 Selected economic indicators: Balance of payments and foreign reserves, 1965-79

	Million kwacha					Percentages		
	Trade balance (a)	Current account balance (a)	Overall balance (a)	International reserves		Arrears on external payments	Copper exports as percentage of total	Terms of trade (1970=100)
				Gross	Net			
1965	142.2	61.6	...	152.8	148.6	--	...	81.7
1966	180.9	52.7	...	167.2	158.0	--	...	122.8
1967	134.5	8.3	-23.7	144.2	134.6	--	...	113.3
1968	164.7	-2.9	6.4	147.4	140.2	--	...	117.3
1969	539.3	338.3	119.4	273.7	267.8	--	95.1	131.8
1970	325.5	77.0	106.3	384.8	381.6	--	95.0	100.0
1971	77.9	-176.5	-20.7	210.0	186.2	--	92.7	72.6
1972	138.7	-148.8	-107.7	125.2	78.6	--	90.7	68.9
1973	384.1	93.4	-8.1	129.6	67.2	--	95.4	90.6
1974	389.1	10.3	18.6	143.8	76.6	--	93.3	88.1
1975	-93.4	-463.8	-250.0	100.8	-75.0	102.1	91.3	43.1
1976	310.2	-45.1	-136.2	89.2	-114.7	205.7	92.7	47.0
1977	168.9	-170.7	-223.5	63.9	-183.5	379.5	91.3	44.5
1978	170.0	-184.0	-258.8	73.6	-311.6	524.8	89.9	38.4
1979	507.0	89.0	158.4	145.9	-283.1	376.0	82.8	46.7

Sources: Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office (various issues).
Bank of Zambia, Report and Statement of Accounts, Lusaka: Bank of Zambia (various issues).

(a) See footnote (12) to Chapter 2 for full explanation.

world commodity markets, and its effects are amplified by the dominant position of copper in Zambia's total export earnings, a proportion which, ironically, has been one of the most stable of variables, with an average of 92 per cent during the period 1969-79 (See Table 2.8).

The balance of payments has been subject not merely to instability but to serious deterioration. Thus both the current and overall balances moved into persistent and substantial deficit during the years 1975 to 1978. The deterioration had started before 1975, however, and perhaps can be traced as far back as 1970, when the terms of trade started to deteriorate. This was followed by deficits in 1971 and 1972, and relatively small surpluses in 1973 and 1974. The impact of this decline is clearly shown by the movement of international reserves which more than doubled over the period 1965 to 1970, but were subsequently depleted by the implicit policy decision to maintain import levels in the expectation that export earnings would eventually recover. Decumulation of gross reserves continued until 1977, when minimum operational levels were reached, while the growth of the monetary authorities' external liabilities caused the level of net international reserves to decline to -K311.6 million in 1978. However even this decumulation was insufficient to finance the fairly modest volume of imports after 1975, and the final result was the rapid accumulation of arrears on external payments, which had reached the equivalent of about 12 months imports by the end of 1978.

2.5.4 Government budget. The budget has proved to be no less vulnerable to mineral price fluctuations than the balance of payments, although more successful attempts have been made to diversify the sources of government revenue than is the case with export earnings. The reason for the vulnerability may be seen from Table 2.9. In the early years of Independence mineral revenue accounted for about 60 per cent of total government revenue, but this proportion fell rapidly after 1970, mainly as a result of a decline in the absolute level of mineral taxation (with the exception of the year 1974).

This loss of revenue provides a partial explanation of the growth of the level of the overall government deficit (or surplus) in the years after 1970. In the years up to 1970 the government budget did not represent a major burden on the economy in the sense that the budget deficit as a proportion of GDP in the period 1965-70 shows a mean of 0.8 per cent. In the nine years from 1971 this proportion was to rise to a mean value of 11.5 per cent; and in the five years 1975-79 the corresponding figure was 14.6 per cent.

This does not provide a complete explanation as examination of the final column of Table 2.9 suggests. Until 1976 real expenditure grew quite rapidly, if erratically, but with tighter budgetary control large falls were observed in the next three years. Thus as will be found in Chapter 8 at least a part of Zambia's budgetary problems may be traced to two large increases in expenditure, particularly that in 1975 (13). However the evidence at this stage

Table 2.9 Selected economic indicators: Government finance, 1965-79

(Percentages)

	Overall deficit or surplus as percentage of GDP (a)	Mineral revenue as percentage of total revenue	Real growth rate of expenditure (b)
1965	-1.9	...	...
1966	-1.7	65.1	...
1967	0.2	59.0	...
1968	-3.7	57.6	...
1969	-0.4	58.7	...
1970	3.1	58.1	10.1
1971	-11.1	36.9	9.8
1972	-7.6	17.9	-12.1
1973	-16.8	28.0	46.6
1974	-4.9	52.6	-30.0
1975	-21.9	13.2	28.0
1976	-13.5	2.6	-4.9
1977	-13.9	-0.2	-25.7
1978	-15.0	--	-1.2
1979	-8.5	1.6	-19.2

Source: Calculated from Appendix S, Tables S.7.1 and S.7.2.

(a) Total revenue less total expenditure.

(b) Growth rate of total expenditure deflated by implicit deflator of total domestic final expenditure.

suggests that the source of the problem was the cessation of mineral revenue.

2.5. Money and credit. As might be expected from a situation in which the behaviour of both the government's borrowing requirement and the balance of payments have been erratic, the growth of the money supply has been far from smooth. The trend growth rate (1965 to 1979) of the money supply (narrowly defined) was 12.3 per cent, of the broader definition 13.8 per cent, while the rate of expansion of domestic credit grew at the trend rate of 25.1 per cent, although the latter figure was from a very small base (14). As will be discussed in Chapter 8, monetary policy in an open exporting less developed economy like Zambia must almost of necessity be a relatively passive aspect of overall economic management. The effect of copper price fluctuations on the money supply is rather unpredictable. In periods of high prices net foreign assets will tend to rise, thus increasing bank assets, but at the same time the high mineral revenue will lead to a decrease in the government's demand for new credit from the banking sector. The converse argument will hold when copper prices are low. The net effect on the money supply will depend on the reaction of other variables, e.g., how fast and to what extent import levels change, and whether the increase in government revenue is saved or is channelled into additional expenditure. This accounts for the variability of the annual growth rates of monetary aggregates shown in Table 2.10.

Table 2.10 Selected economic indicators: Monetary aggregates - rates of change, 1965-80

	Money plus quasi-money (broad money)	Domestic credit (gross) (a)
1965	...	...
1966	35.1	36.5
1967	16.6	25.7
1968	29.1	17.1
1969	28.7	20.4
1970	26.3	15.6
1971	-10.4	26.7
1972	7.1	19.7
1973	21.8	31.0
1974	6.1	9.8
1975	11.9	69.9
1976	26.5	30.0
1977	12.1	31.7
1978	-8.5	16.1
1979	30.1	8.1
1980	9.0	15.1

Source: Calculated from Bank of Zambia, Report and Statement of Accounts, Lusaka: Bank of Zambia (various issues)

(a) Gross claims by the banking system on the private sector and government.

One argument can be dispelled - that rapid monetary growth such as there has been in Zambia necessarily leads to a higher rate of inflation. An analysis of the association between a number of measures of inflation and monetary aggregates (including some lagged variables) is conducted in Section 8.7.2. From this it will be seen that the degree of association between the rate of consumer price inflation and the growth of monetary variables is low in almost every case, with only one aggregate (lagged gross domestic credit expansion) providing a statistically significant result. Any monetary explanation of inflation would have to proceed by exploring the behaviour of the velocity of circulation of money, and this is discussed further in Chapter 7.

2.5.6 Inflation. It was noted in Chapter 1 that a frequent criterion in discussing the incidence of economic instability is the level of inflation in the country concerned. It should by now be apparent from the foregoing analysis that Zambia's economic situation during the 1970's was one of considerable instability, and indeed, deterioration. Yet as Table 2.11 shows, Zambia's rate of inflation has for most of the period under discussion been remarkably similar to international rates of inflation. Thus it can hardly be argued that inflation is the root cause of Zambia's instability.

Of the four indices calculated for Zambia, the most directly comparable with international indices would be the consumer price index for high income households, which is based on a much larger consumption "basket" than that for the low income group, and is

Table 2.11 Comparative levels of inflation, 1965-79
(Annual percentage changes)

	Zambia					
	World (a) (1)	Non-oil LDCs (Africa) (a) (b) (2)	Consumer prices		GDP deflator (e) (5)	Non-mineral GDP deflator (f) (6)
			High income (c) (3)	Low income (d) (4)		
1965	5.0	4.6	4.2	8.1	...	...
1966	5.1	5.1	5.1	10.2	23.7	5.6
1967	4.2	5.2	5.1	5.0	0.3	10.7
1968	4.4	6.0	8.6	10.9	15.9	7.7
1969	5.1	4.4	4.4	2.4	23.0	5.7
1970	6.0	4.3	5.0	2.6	-8.0	8.8
1971	5.9	5.1	5.8	4.9	-6.4	7.0
1972	5.8	5.8	5.6	5.1	3.8	5.3
1973	9.6	9.8	9.0	6.5	20.3	4.8
1974	15.3	15.8	7.5	8.1	8.7	6.4
1975	13.4	15.6	8.5	10.1	-14.1	6.8
1976	11.1	15.5	16.1	18.8	13.0	11.7
1977	11.4	19.8	17.1	19.8	9.4	16.1
1978	9.7	15.8	12.2	16.4	13.4	16.7
1979	12.0	16.5	10.7	9.2	23.1	8.3
Average (g) 1966-1979	8.4	10.2	8.6	9.2	8.3	8.6

Sources: Columns 1 and 2: International Monetary Fund, International Statistics Yearbook, 1980, Washington, International Monetary Fund; columns 3 and 4: Republic of Zambia, Monthly Digest of Statistics, Lusaka; Central Statistical Office, various issues; columns 5 and 6: calculated from Appendix S, Tables S.1.1 and S.1.2.

- (a) Geometric averages of consumer prices weighted by GDP.
- (b) Used in preference to all LDCs to remove bias created by high inflation rates in South America.
- (c) An index prepared for household on incomes of over K3600 per annum.
- (d) Households on incomes of less than K1200 per annum.
- (e) Implicit deflator based on 1970 values of GDP.
- (f) As (e), but with mining activity deducted.
- (g) Geometric mean.

therefore more representative of general price movements within the country. A measure which might at first sight be thought to be generally representative would be the implicit GDP deflator, such as is used by the World Bank (15). This is particularly inappropriate in an export dependent economy such as Zambia which relies on one volatile commodity. Variation in the price of the commodity will be transmitted into the GDP deflators, and may be technically correct so far as national accounting purposes are concerned, but the resulting index can hardly be taken as representative of the rate of inflation faced by households and individuals, or as indicative of the underlying inflationary pressure faced by a government in its policy formulation. However the removal of mining activity had the effect of producing an index which follows very closely the path of the consumer price indices (16).

Whichever index is chosen there is very little difference between world or regional inflation and that within Zambia when the averages over the period are considered, and the implicit GDP deflator is the only one to show substantial differences from year to year. It would therefore appear that Zambia's inflationary performance has been no better or worse than other countries and this is not a major source of its problems.

The behaviour of earnings has not been such as to give support to any contention that price inflation has been led by an expansion of earnings during the 1970's although this may have been true in the 1960's. In the years from 1965 to 1970 earnings rose by about 84 per

cent, very much more rapidly than the increase in prices, so that real earnings (as shown in Table 2.12) rose by 60 per cent. In the following years up to 1977 money earnings rose by only 60 per cent with the result that in a more highly inflationary situation real earnings fell back by about 17 per cent. It should of course be noted that these figures are for earnings (i.e., actual receipts) as opposed to wage rates and hence no doubt reflect shorter working hours, less overtime and other consequences of economic recession. Nevertheless it is suggested that in the 1970's cost-push inflationary pressures arising from increases in earnings have probably moderated. However, it is noted that the behaviour of the index of real earnings (Table 2.12) has been far more erratic in the 1970's than earlier, suggesting a periodic attempt every two or three years to re-establish the real purchasing power of earnings. Such surges would appear to have occurred in 1967, 1970, 1973 and 1976. Whereas before 1970 the effect was, in each case, to increase substantially the real value of earnings, in the 1970's there appears to have been established what might perhaps be called an "inverse ratchet" effect with periodic surges, but each not quite sufficient to restore the previous peak of real earnings.

2.5.7 Summary. The nature of the instability from which Zambia has suffered, particularly during the 1970's, is substantially different from the inflationary monetary phenomenon which it appeared underpinned some general analyses (see Chapter 1). It has been noted that most real economic variables - GDP, per capita GDP, employment levels, export earnings, tax revenues, etc. - could experience sharp

Table 2.12 Selected economic indicators:
employment and earnings, 1965-79

(Percentages)

	Index of employment 1970 = 100	Index of real earnings (a): Zambian employees 1970 = 100	Annual rate of change of nominal earnings: all employees
1965	87.0	62.3	...
1966	98.2	63.4	6.2
1967	91.0	83.6	27.3
1968	92.9	80.7	5.3
1969	95.7	80.3	3.9
1970	100.0	100.0	13.4
1971	106.3	106.1	9.6
1972	107.3	99.3	1.7
1973	108.9	104.3	10.0
1974	112.2	95.3	1.0
1975	114.7	88.0	0.9
1976	107.5	96.0	25.3
1977	108.7	82.7	2.1
1978	105.2	...	...
1979	106.2	...	...

Source: Calculated from Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office (various issues).

(a) Deflated by index of consumer prices for low income households.

fluctuations, and could do so for reasons apparently completely beyond the control of the country. Indeed the term "instability" is inadequate to describe the economic performance, and it was noted that a substantial deterioration has taken place in several central areas of the economy, perhaps most strikingly in the fall in real per capita GDP adjusted for movements in the terms of trade, which have declined rapidly particularly in the post-1974 period.

This deterioration was clearly seen in the brief discussion of the country's balance of payments, international reserve position and government budgetary performance. The latter was seen to be in a strong position until 1970, and substantial improvements in the foreign resources situation also occurred during this period. In the years from 1971 to 1974 it is now apparent that the first signs of financial constraints were appearing; but it was not until 1975 that these constraints became acute.

It had been possible for an observer describing the late 1960's to write:

"Zambia is unusual among developing countries in that she has large resources of her own to finance development....."
(Harvey, 1971a).

But even at that time Harvey was to argue that Zambia was

"approaching a position familiar to most developing countries in which the ability of the government to spend money constructively on well-designed, carefully integrated projects and programmes exceeds its ability to finance such expenditure....."
(Harvey, 1971b).

Some of the constraints which were perhaps of more relevance in the 1960's will be discussed in section 2.7, after a brief

examination of the extent to which the dual gap analysis introduced in Chapter 1 provides a useful explanation of the constrained resource position which Zambia faced particularly in the latter part of the 1970's.

2.6 The relevance of the dual-gap model

The dual-gap model introduced in Chapter 1, and elaborated in Appendix I.1, can make only a limited contribution to the analysis of Zambia's economic performance during the period under review (1965-78). The model presented by Chenery and Strout (1979) suggested that a typical sequence of development might be one in which initial attempts to accelerate growth are constrained by the investment-savings gap, i.e., a domestic resource gap, and then, at a later stage, by a foreign resource constraint, the gap between exports and investments. In both phases, foreign assistance would be used to supplement available resources, the amount being determined by the larger of the two gaps. In an advanced stage the need for foreign assistance would fall away as growth became self-sustaining.

There are several reasons why it is suggested that the model is of little assistance in analysing Zambia's economic situation. Firstly, the model concerns ex ante aggregates; in the ex post sense the two gaps must be equal, by definition. Secondly, the model implicitly assumes, at least in its simpler forms, that there is an unrestrained availability of foreign resources; in other words it does not present the donors' or other financial institutions' ability or willingness to lend as a constraint. Perhaps more seriously the

model simply indicates which of the two gaps is dominant: its analysis is in terms of relative movements of the two aggregates assigning no particular significance to a situation in which both gaps are growing in real and absolute terms. Moreover, adoption of the model tends artificially to concentrate attention on only two constraints, both of which are financial, to the exclusion of other and perhaps more significant constraints. Finally, the direct application of the dual-gap analysis is weakened by the fact that both domestic and foreign resource availability are likely in Zambia to move in phase: again an immediate consequence of the important position of the mining industry. In years of high mineral prices, not only will foreign earnings rise, but so too will the tax receipts of the government, with the probable result that government savings will increase. The only rider to this statement is that the lags involved in the payment of tax accrued may lead to a slight weakening of this effect.

In stating these reservations it is not being argued that it is impossible in practice to estimate which of the two gaps is the dominant one in any particular period. Killick (1978, pp. 123-125) describes a method (17) by which he estimated that Ghana's binding resource constraint was foreign exchange during the 1960's. Nevertheless, he too recognizes that both resource gaps were important, concluding that by the end of the 1960's there were deficiencies in the capacities to invest wisely, to save and to import.

In view of the foregoing discussion it was decided not to develop a formal analysis of the dual-gap model in this study.

However a less formal examination of perceived trends of various financial variables indicates that the model would provide only a partial explanation. In the following discussion it should be borne in mind that the basic national accounting identity holds in which:

$$\begin{aligned} \text{Exports} - \text{Imports} = & (\text{Net saving} + \text{consumption of fixed capital}) \\ & - (\text{Gross fixed capital formation} \\ & + \text{increase in stock}) \end{aligned}$$

That is, the relationship under discussion is the ex post identity, not the ex ante relationship involving planned levels of investment, savings, exports and imports, implied by the theoretical model.

Table 2.13 presents various pertinent domestic and foreign resource aggregates, all except the final row being expressed in current prices. In Part I the level of net rather than gross fixed capital formation is used as an indicator of the level of "intentional" investment, and is used in preference to total investment which would also include "increase in stocks", since the latter may be regarded as unintentional investment. The comparison between domestic savings and net fixed capital formation indicates that in direct contrast to the Chenery/Strout sequence domestic resources were not a constraint in the years before 1971, but that thereafter, with the exception of 1973 and 1974 (years of high copper prices), net fixed capital formation exceeded net domestic savings, by large amounts in most years, and particularly in 1975 when overall dissaving occurred. There is a moderately strong relationship between the surplus on the government's current account and the overall level of savings, as is to be expected in an economy where

Table 2.13 Domestic and foreign financial resources, 1965-79
(Million kwacha)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
I. Domestic resources															
1. Saving	187.6	243.2	233.2	244.1	465.8	307.9	101.1	133.0	331.2	483.7	-69.8	246.8	199.3	143.8	161.8
2. Net fixed capital formation (a)	90.5	140.1	175.9	191.0	166.8	242.2	230.2	250.4	211.2	283.4	359.0	332.0	363.0	211.0	96.0
3. Saving minus NCF	97.1	103.1	57.3	53.1	298.9	65.5	-129.1	-117.4	120.0	200.3	-428.8	-85.2	-163.7	-67.2	65.8
4. Government surplus/deficit on current account	56.3 (b)	88.4 (b)	135.8 (b)	92.4	174.7	172.9	-18.2	-17.4	15.1	243.8	-98.7	-119.5	-96.3	-30.2	-129.4
II. Foreign resources															
5. Balance of payments current account surplus	61.6	52.7	8.4	-2.9	338.3	77.0	-176.5	-148.8	78.0	10.3	-463.8	-95.7	-170.7	-160.0	89.0
6. Financing by changes in net foreign reserves (c)	--	-9.4	23.4	-5.6	-127.6	-113.8	+195.4	+107.6	+11.4	-9.4	+151.6	+39.7	+68.8	+128.1	-28.5
7. Increase in external borrowing (net)	-2	5	25	14	37	217	4	33	-34	70	218	277	82	77	102
8. Increase in external payment arrears	--	--	--	--	--	--	--	--	--	--	102.1	103.6	173.8	145.3	-148.8
9. "Real" value of exports (d)	418.4	501.6	504.9	551.3	930.8	673.2	455.6	487.2	580.8	572.8	265.7	342.0	284.4	228.0	314.4

Sources: 1. Appendix S, Table S.1.7.
2. Calculated from Appendix S, Tables S.1.3 and S.1.6.

4. Appendix S, Table S.7.1.

5. Table 2.8.

6. Calculated from Table 2.8.

7. Calculated from data supplied to the author by the World Bank from its Debtor Reporting System.

8. Bank of Zambia, Report and Statement of Accounts, 1979, Lusaka: Bank of Zambia.

(a) Gross fixed capital formation less consumption of fixed capital.

(b) These figures are for the financial years 1964/5, 1965/6 and 1966/7, the last being for the 18 month period up to December 1967.

(c) A negative sign indicates an increase in reserves; a positive sign a decrease.

(d) Deflated by implicit deflators of imports of goods and services.

government constitutes so large a proportion of economic activity (18). A correlation coefficient of 0.7257 was obtained between the government's current surplus and the level of domestic savings; a slightly higher coefficient (0.8076) was found between the government's surplus and the difference between savings and net fixed capital formation.

It is also apparent that foreign resources were not a constraint in the years between 1965 and 1971, a fact which follows from the surplus of savings over investment. Thus the current account was in surplus for each of these years, with the exception of the very small deficit in 1968, and Zambia was able to accumulate very substantial levels of foreign reserves. Conversely Zambia had little need to resort to foreign borrowing and with the exception of 1970, substantial inflows of foreign loans were not seen until 1964, by which time net foreign reserves had diminished to their lowest levels since 1965. By 1975 foreign resources had become so severely constrained that the accumulation of arrears on external payments began. The extent of the constraint is emphasized by the series of exports valued at 1970 prices, where the real value of exports is seen to decline very sharply in 1975. The average purchasing power of exports in the period 1975-79 was respectively 49.3 per cent and 51.7 per cent of the averages in the periods 1965-69 and 1970-74; the decline between the maximum in 1969 and the minimum in 1978 was over 75 per cent.

Thus it should be apparent that neither domestic nor foreign financial resources constituted a serious constraint on the process

of development in the years up to and including 1970, thus lending credence to the earlier quotation from Harvey (1971b), and confirming the observation made earlier in this section that the two constraints might be expected to move in phase in an open economy like Zambia. However, the developments from 1975 ensured that financial constraints were to become far more important than most others; although dual-gap analysis might have cast some light as to which was the dominant constraint this would only have given guidance on the relative importance of each with no particular significance attached to the substantial deterioration in the position of both foreign and domestic resources.

2.7 Non-financial constraints

Although this study is essentially concerned with financial constraints it is necessary to consider briefly those factors which at various stages have been seen to create obstacles to steady and well balanced development. An extensive survey of the problems faced by Zambia is presented in Elliott (1971). At that time, in the absence of a significant financial constraint (see Harvey, 1971a and Goodman, 1971), the most severe problem was analysed as the shortage of skilled labour. Thus Jolly (1971) perceived this problem to be so acute that he wrote:

"There are two reasons for giving particular attention to the shortage and scarcity of skills as a constraint to development in Zambia. Firstly, because the lack of skills and education in Zambia was the major constraint to expansion in the years after Independence. Secondly, because this lack was so extensive in comparison with that in other developing countries that Zambia's experience serves as the pathological condition from which to study the symptoms of acute scarcity of manpower in the process of development." (1971, p. 21).

Jolly continues to argue that although the rate of economic growth in these early years was rapid, it could have been even higher if the scarcity of skilled manpower could have been removed. It would be difficult to make such a contention ten years later, partly because of the considerable volume of resources which have been devoted to education in the years since 1965, and partly because of the very low rates of growth which have occurred in subsequent years. Indeed if the quotation were to be rewritten, substituting financial for manpower concepts, it would not be an inaccurate statement.

A diminution of the rate of growth was not the only economic problem which Jolly analyses as resulting from the scarcity. The continued presence of a large expatriate work force, particularly in the mining industry, was essential, and Jolly argues that the high wages necessary to attract or retain these workers created inflationary expectations among the African work force, which the government lacked the political strength to resist, with the consequence that earnings rose rapidly, as may be seen from Table 2.12. Moreover Jolly suggests that income inequalities increased as a result between skilled and unskilled African and non-African, and between rural and urban areas.

Another consequence suggested by Jolly was that the "quality" of growth was reduced. This is perhaps best demonstrated by considering the value added of the government sector, which is measured by inputs, i.e., mainly wages and salaries paid to its employees. Thus although the level of employment and real wages paid to this sector

may have risen, creating the impression of real growth, it could be contended that the value of its output did not increase commensurately, because of a loss of efficiency due to insufficiently educated or skilled workers.

Perhaps the most significant effect of the shortage of skilled manpower was in the erosion of the basis for balanced economic growth in subsequent years. Thus Jolly suggests that rural areas received lower priority in the allocation of scarce skills, so that a disproportionate amount of the growth which has occurred has done so in the urban areas which were already relatively highly developed by the standards of other similar developing countries.

It could also be surmised that the shortage of skilled manpower was one of the causes of the capital intensity of new investment projects; that is a high capital labour ratio was necessary to maximize the level of utilization of the scarce resource - skilled labour. This could in turn set a vicious circle in motion in which self-fulfilling expectations of further and perhaps even more highly capital-intensive techniques are created. Moreover the high labour productivity associated with capital intensive techniques of production can lead to the establishment of high earnings in some industries, leading, by a demonstration effect, to rises in other industries, thus pushing up labour costs and eventually leading employer to attempt to increase their own capital-labour ratios.

The effects discussed in the preceding paragraphs all represent plausible explanations for the development of an extreme degree of

economic dualism which has been noted by most writers on the Zambian economy, and which will be discussed in slightly more detail in the next chapter.

Knight (1971) develops the argument concerning wages in rather more detail. He sees the main pressures for increasing earnings levels as coming from the mining industry: in particular the technical conditions in the industry (high capita-labour ratios) and the bargaining power of the mining unions. Once the pattern is set, increases spread through the rest of the economy by means of political and union pressure. The effect of rising wages could be either to reduce production or to increase prices. Production seems to have suffered little during this period, and Knight argues that price levels were increased. The result was that Zambia became a high labour cost economy, and consequently developed a comparative disadvantage relative to neighbouring countries in manufactured products. It is also of interest that Knight should comment as follows:

"The increased cost of public services and development expenditures can restrict their provision; but this is unlikely to happen in Zambia until the government is faced with a financial constraint". (1971, p. 118).

Knight also argued that the increase in wages would be likely to have tightened the foreign exchange and savings constraints, while allowing only a small relaxation on the constraint imposed by limited demand for domestically produced industrial goods. The tightening of the foreign exchange constraint is easily enough understood in terms of a high marginal propensity to import in the private consumption sector, but the effect on the savings constraints is based on a

limited cross-section analysis of sample household budget data which suggested a negative marginal propensity to save, and its validity is questionable. Nevertheless both constraints have tightened.

Further problems specific to certain sectors were identified. Thus Kessel (1971) suggested that even when the Zambianisation programme had been completed, domestic expenditure by the mines would mainly take the form of financial payments (taxation) rather than payments for intermediate goods and factor services. This probably remains true in the sense that forward linkages (domestic fabrication of copper products) are almost negligible and backward linkages (the purchase of intermediate or capital goods from domestic producers) has shown only modest growth. To use Kessel's imagery:

"Mining generally acts as a fountainhead for, rather than an engine of, growth in that it provides financial revenue rather than sustaining a high demand for domestically produced goods and services in the host country". (1971, p. 267).

The range of constraints identified by Roberts and Elliott in the agricultural sector is manifold, but the policy prescriptions would be classified under three broad headings: credit to farmers, pricing policy and marketing arrangements. It is suggested that most critics of government policy in Zambia would agree that there was considerable deficiency in the extent to which these aspects of government policy have been managed. Faber (1971) suggests that manufacturing growth could have been even higher in the immediate post-independence years than the very impressive rates which were achieved, but for the advent of UDI and the subsequent transportation difficulties (which

have persisted up to the present, albeit from different causes in the most recent past). Bostock (1971) provides a description of the transportation system and its crucial importance to the economy in the early years of Independence.

The purpose of including this brief discussion of the study by Elliott et al is to indicate that even at the beginning of the 1970's the signs of the financial constraints to come were not only in evidence but had been identified by some economists. What surely could not have been predicted at that stage was the severity of these constraints and the rapidity with which they developed, hastened by the oil price revolution and the subsequent recession in the industrialized countries. The principal concern at that time would seem to have been the growth of inflationary pressures, both of a cost-push nature in the form of rising labour costs, and a demand-pull nature resulting from excessive government deficit financing. While both effects have undoubtedly been present it was shown in Table 2.5 that Zambia's inflation did not differ markedly from other countries. It is also suggested that although financial constraints became dominant in the second half of the 1970's, they are not the only constraints. Thus if the constraints on foreign exchange, domestic savings, the government budget, and so on, could be removed it is likely that the constraints identified in the study by Elliott et al would re-emerge as serious barriers to development. Although it is not a central theme of this study to consider the non-financial aspects they will be given some consideration in subsequent chapters.

2.8 Conclusion

It has been shown that a very substantial measure of instability has afflicted many of the principal economic indicators in the Zambian economy throughout the period under review, and indeed in the years before 1964. It has also been suggested that the term "instability" is too weak to describe the performance of many of these, and that there has been real deterioration or regression certainly in terms of the real "living standards" of the population as measured by such indicators as GDP per capita adjusted for the terms of trade. It has been suggested that financial resources did not impose any significant constraint on the early years of development, but that the situation changed very rapidly in the years after 1970. Indeed it is perhaps the case that the resource situation changed much more quickly than the authorities' perception of the availability of real resources. It seems likely that the authorities are often more concerned with current valuations than with estimates of real magnitudes. Thus although in 1974 the economy appeared to be in a very favourable position in terms of some of the variables such as government revenue, and export earnings, when these are adjusted to allow for inflation and the terms of trade the years 1973 and 1974 appear to represent no more than a temporary halt in the secular deterioration which was affecting many areas of the economy. The next chapter will consider in rather more detail the nature and implications of certain of the fundamental structural imbalances which may be observed in the economy.

NOTES

1. Detailed historical accounts of the pre-colonial era can be found in Hall (1965) and Gann (1958).
2. Analysis of the colonial era (1890-1964) is contained in Hall (1965), Kaunda (1962) and Gann (1964).
3. For discussion of Post-Independence developments of a general political and social nature see Pettman (1974), Hall (1973), Tordoff (1974) and Martin (1975).
4. Simple unweighted arithmetic average.
5. Substantial variation occurs in the value added by mining activity when measured alternatively at current and constant prices. The problems are discussed further in Appendix III.1.
6. The figures mentioned in this paragraph for the period from 1965 may be calculated from Appendix S, Table S.1.3 and are discussed in considerably greater detail in Chapter 3.
7. Sources of information: 1945 and 1953 from the Republic of Zambia National Income and Social Accounts of Northern Rhodesia, 1945-1953, CSO (Lusaka) (Table 8, page 30); 1964 figure from Mining Yearbook of Zambia, 1969, Copper Industry Service Bureau, Ndola (Table 2, page 28). (Government publications in that period did not distinguish income tax paid by mining companies from other sources).
8. This issue will be examined in greater depth in Chapter 5.
9. This is an exponential trend (annual) growth rate. This and other measures will be considered at a later stage (see Appendix III.3).
10. Based on 1979 mid-year estimates and other estimates contained in CSO Monthly Digest of Statistics (Lusaka) July/September 1979.
11. Ratio based on data in Annex Table 5 of World Bank (1980) - World Development Report, 1980. The average ratio is an unweighted arithmetic mean for 86 low-income and middle-income countries (those with per capita GNP of \$3500 or less, as per World Bank classification). The corresponding standard deviation was 9.15.
12. The following terminology is used: the balance of trade is the surplus or deficit on merchandise trade; the balance on current account is equal to the balance of trade plus net "invisible"

trade (services, factor payments, etc.) and unrequited transfers; the overall balance is the foregoing plus net flows into the country of capital (e.g., direct foreign investment, loans - i.e., the balance on capital account; while monetary movements are movements relating to reserves and related transactions which finance or absorb the overall balance.

13. The apparent surge in expenditure in 1973 is mainly caused by a large "book transaction" transferring liabilities from government to a parastatal, which was compensated by an equivalent revenue entry. The increase in 1975 was a result of rising outlays especially on current account. Chapter 8 expands on this.
14. The precise definitions of these variables may be found in Chapter 8, Section 8.7.
15. See World Bank, World Development Report, 1980, Table 1 (appendix).
16. An alternative index which is also used in this study is the implicit deflator of total domestic final expenditure on GDP.
17. The problem was to measure ex ante magnitudes. Killick assumes that export earnings in the short- and medium-term are exogenously determined and that investment is identical ex post and ex ante. This means that neither exports nor investment adjust to bring the gaps to ex post equality; adjustment can occur only in either imports or savings. The dominant constraint is then determined by the functional relationships (for savings and imports) in which foreign capital is an explanatory variable. If imports are correlated positively with foreign capital inflows with savings independent of the latter the savings constraint is dominant. Savings negatively correlated with foreign inflows and imports independent shows the foreign constraint to be binding.
18. The surplus on government current account is not compatible with the concept of government savings so a complete reconciliation was not attempted.

CHAPTER 3 STRUCTURAL INSTABILITY AND IMBALANCES

3.1 Introduction

In Chapter 1 it was found that many approaches to instability stress the importance of financial instability and inflation often to the exclusion of "real" economic variables such as production, employment and real earnings. This chapter will discuss in some detail the structural behaviour of gross domestic product in an attempt to identify those areas of the economy which have been most vulnerable in the post-Independence period. Some discussion will be undertaken of the extent to which Zambia has succeeded in diversifying its industrial base, and the chapter will conclude with the consideration of the existence of economic dualism as a consequence of the high concentration on the mineral sector.

3.2 The growth of gross domestic product

The mining industry remains nearly as dominant in the economy at it was at Independence, certainly in terms of its contribution to export earnings, which as shown in section 2.5 still accounts for over 90 per cent of "visible" export earnings. The evidence is less clear when it comes to the sector's contribution to gross domestic product (GDP), as the second part of Table 3.1 shows. Thus we find a very large decrease in the share of mining in total GDP measured in current prices: in 1965 mining is seen to have contributed 41.5 per cent of GDP, falling to 36.0 per cent by 1970, and then being reduced to a half of the latter level by 1979. The

Table 3.1 Gross domestic product and mining: growth rates and sectoral shares

	1965	1970	1974	1979	Trend growth rates (a)			
					1965-70	1970-74	1974-79	
	(Million kwacha - 1970 prices)				(Percentages)			
Total GDP	1,186.9	1,277.7	1,473.9	1,361.5	1.83	3.62	-0.92	2.00
Total GDP adjusted for terms of trade	990.1	1,277.7	1,369.2	908.0	6.43	-3.19	-6.49	-1.00
Non-mining GDP	619.0	817.4	999.6	956.4	5.35	4.79	-0.88	3.58
Mining					-5.37	1.39	-1.03	-1.75
	(Percentages)							
Share of mining in GDP:								
At current prices	41.5	36.0	32.5	18.1				
At 1970 prices	47.8	36.0	32.2	29.7				
At 1965 prices	41.5	25.8	--	--				

Source: Appendix S, Table S.1.2 and Appendix III.2, Table III.2.1.

(a) Exponential trend growth rate (see Appendix III.3).

decline is somewhat less marked when measured in constant 1970 prices, but is, nevertheless, substantial. The decline between 1965 and 1970 is most rapid when measured in 1965 prices.

These figures lend support to discussion in chapter 2 concerning the general economic instability caused by reliance on copper production. But it is this very importance of the mining sector and the volatility of its price from year to year which results in certain conceptual problems in interpreting national accounting statistics on conventional lines. Obviously the apparent variation in the sectoral share of mining is due to the difference in price base, since the copper price, which is used as the indicator of unit value in estimating gross output in the mining sector, can vary by large proportions in either direction during the course of the year. The constant price measure gives an indication of the volume of production and is therefore a reasonable measure of output, and also factor utilization. On the other hand it is undoubtedly the case that the current price figures give a fairer indication of the "real" income derived from mining activity, in the sense that both government revenue and export earnings are affected by any fall in the level of copper price.

The problem of dealing with different price bases, including adjustments to mining output, are discussed in detail in Appendix III.1. One means of overcoming the large variation in constant price series when base years are changed caused by this type of price instability would be to construct a price base over a number

of years rather than simply having one year as base. Thus a base of, say, between 3 and 5 years would include mineral prices over a large part or all of the mineral price cycle and would thus avoid some of the problems of interpreting national accounting statistics such as are seen in this instance.

The Central Statistical Office (Zambia) has introduced a measure designed to provide a more accurate assessment of the real income level, as opposed to the volume of output indicated by the unadjusted figure for constant price gross domestic product. This measure, gross domestic product adjusted for the terms of trade, is made by adding to GDP at base year prices, the difference between the current value of exports when deflated firstly by the import price index and secondly by the implicit price index for metal mining activity (see page 7 of Republic of Zambia, National Accounts and Input-output Tables 1973). Thus, the latter index provides some measure of the increase of domestic output prices in the mining industry, while the former index demonstrates the purchasing power of a given volume of output vis-à-vis imports from the rest of the world. This represents a most useful and interesting application of the widely used concept of the terms of trade, and it is suggested that other developing countries prone to substantial variations in the terms of trade caused by movements in the prices of their main export commodities might consider using such a measure to indicate the extent to which they are affected by price instability. The concept is not believed to be widely used. Even developed countries such as the United Kingdom use fairly sophisticated techniques

to ensure the accurate measurement of their terms of trade (for instance see Sellwood and Schiller (1977)), but do not extend the concept to measure the impact on the domestic economy as part of the official statistical service.

A complete series for the years 1965-79 of GDP adjusted for the terms of trade is described and summarized in Appendix III.2, and the figures for selected years together with growth rates for the appropriate periods appear in Table 3.1.

The figures in the upper right quadrant in Table 3.1 provide an indication of the effects on GDP of the instability associated with the mining sector. Mining activity is seen to have declined during the period as a whole at a trend rate of 1.7 per cent (1), with the most rapid decline apparently occurring in the period 1965-70. This effect, however, is probably caused by the national accounting difficulties associated with rebasing already discussed. Nevertheless this is not an inaccurate overall summary, since mining production had stagnated at around 700,000 tonnes, with a sharp decline in 1978 and 1979; real production costs also rose significantly during most of the 1970s. Thus the overall effect is that a decline in real value added was to be expected. The trends relating to the mining industry will be explored in greater detail in chapter 5.

By contrast value added in the non-mining sector showed a fairly strong upward trend over most of the period 1965-74 and it was only in the years after 1974 that a decline started. These two

trends combine to give a gradual rise from 1965 to 1970 in total GDP, a more rapid increase in the next four years, and an overall decline in the rate of about 1 per cent annually thereafter. It is total GDP adjusted for the terms of trade effects in which the sharpest variations occur. The very rapid increase during the period 1965-70 of over 6 per cent per annum, is reversed from 1970 onwards: from 1974-79 this aggregate fell at an annual average rate of 6.5 per cent. Thus by 1979 GDP adjusted for the terms of trade was over 8 per cent below its 1965 level; in per capita terms the decline amounts to over 40 per cent. It is perhaps true to say that no other single measure summarizes better the economic decline experienced by Zambia since Independence.

Table 3.2, which provides an international comparison of growth rates, also serves to illustrate the weakness of Zambia's economic performance throughout the period since 1965. Thus Zambia's growth rate was only about half the world average during the period 1965-78, and was little more than one-third that of the less developed countries taken as a group. Similarly the decline in per capita GDP experienced by Zambia is accentuated by the fairly rapid rates achieved in all of the major international groupings of countries. While there has been a reduction in the rate of growth in most countries in the period from 1974 onwards, once again it appears true to say that the decline in Zambia has been more pronounced than elsewhere.

Table 3.2 Comparative annual rates of growth of total and per capita gross domestic product, 1965-78 (a)

	Total GDP				Per capita GDP					
	1965-70	1970-74	1974-78	1970-78	1965-70	1970-74	1974-78	1970-78	1965-78	
World (b)	5.6	5.3	3.8	4.0	4.7	3.5	3.5	3.5	2.2	2.8
Developed economies	4.9	4.3	3.3	3.3	3.9	3.8	3.6	3.6	2.5	3.0
Centrally planned economies (c)	7.2	6.5	5.0	5.8	6.4	6.1	5.7	5.7	4.0	5.5
Less developed economies	6.3	6.8	5.3	6.0	6.3	3.9	4.4	4.4	3.1	3.9
Zambia	1.8	3.7	0.6	2.3	2.4	-0.9	0.4	0.4	-2.4	-0.7

Source: United Nations Yearbook of National Accounts Statistics, 1979, New York: United Nations, 1980 (Tables 6A and 6B).

- (a) Growth rates are geometric average rates and therefore differ from estimates in other tables.
- (b) Excluding centrally planned economies.
- (c) Net Material Product.

The analysis of Chapter 2 (sections 2.5, 2.6 and 2.7) led to the conclusion that severe financial constraints, principally those of foreign exchange earnings and government tax revenue, emerged during the 1970s and that this was instrumental in causing a deterioration in Zambia's economic performance. This section has shown the extent to which the Zambian economy and per capita real income (adjusted for terms of trade effects) declined during this period. It seems reasonable to hypothesize that this decline is substantially due to the emergence of financial constraints, whose precise nature will be explored in later chapters.

3.3 The structure of gross domestic product

The previous section reviewed the growth record of the Zambian economy noting the very different performance of the mining and non-mining sectors, and the difficulty of interpreting constant price series (and hence growth records) in an economy heavily dependent on a volatile primary commodity. In this section the more detailed structure of GDP is discussed in terms of its composition by kind of economic activity, by type of expenditure and by category of income. In each case the structure is examined on the basis of current price valuations, because of the difficulties of rebasing in order to obtain a consistent series from 1965 to 1979, which were discussed in the previous section. However in appropriate cases comparisons have been made between current and constant price series.

3.3.1 GDP by kind of economic activity. Table 3.3 shows the proportionate structure of GDP by kind of economic activity at current prices. The outstanding feature of this table is the extremely large fall in the share of the mining sector which has previously been mentioned. The decline was not steady: the initial level in 1965 was 41.5 per cent and a maximum was reached in 1969 of 48.6 per cent. Decline was very rapid in the two subsequent years, so that in 1971 the mining sector's share was 23.1 per cent, less than half the 1969 level. A temporary increase in 1973 and 1974 was followed by another extremely large fall in 1975. At its nadir in 1977 the sector's share was less than one-quarter of its maximum level. The reasons are not difficult to identify: wholesale prices rose by over 300 per cent in the period 1966-79 while the price of copper rose by about 47 per cent (2). Thus the value added per tonne of mining output was squeezed by input costs which rose more rapidly than output prices.

There was a corresponding increase in almost every other sector - the main exceptions have been subsistence agriculture and wholesale retail trade, which remained fairly static apparently varying in sectoral share as a result of changes in the relative share of mining output rather than due to any major single factor within the sectors themselves. The largest increase occurred in the manufacturing sector, whose proportional contribution to GDP increased from 6.6 per cent to as much as 17.2 per cent by 1978. Although subsistence agriculture did not increase, it is noted that the

Table 3.3 Structure of gross domestic product in current market prices
by kind of economic activity, 1965-79

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
	(Percentages)														
Agriculture - commercial subaistence	2.8 10.8	2.9 9.9	2.7 9.5	2.3 8.5	2.0 7.2	3.2 7.4	4.4 8.5	4.9 7.8	3.9 7.4	3.6 7.0	4.0 9.1	4.9 9.2	5.4 10.4	5.0 10.8	4.1 10.5
Mining	41.5	44.1	36.0	38.0	48.6	36.0	23.1	24.1	32.4	32.5	13.6	17.6	11.5	12.7	18.1
Manufacturing	6.6	8.1	9.3	10.1	8.5	10.1	12.6	13.5	12.3	12.6	15.8	14.2	15.5	17.0	16.0
Electricity, gas, and water	0.7	0.9	0.9	1.2	1.1	1.5	1.9	2.3	2.0	2.2	2.7	2.5	2.5	2.1	2.0
Construction	6.1	6.9	6.9	6.4	5.7	7.1	8.3	7.4	6.4	6.7	9.5	9.5	9.2	6.7	4.8
Wholesale and retail trade	11.2	8.9	11.4	11.6	7.1	9.3	9.5	9.5	8.8	8.9	8.4	8.0	8.9	9.5	9.5
Hotels and restaurants	0.6	0.7	0.8	1.0	1.0	1.2	1.4	1.4	1.2	1.1	1.6	1.5	1.6	1.7	1.8
Transport, etc.	4.3	3.9	5.2	4.2	3.2	3.8	5.2	4.7	4.1	4.0	5.6	6.1	6.7	6.4	6.2
Financial and business services	4.2	3.8	5.1	5.1	5.1	6.9	8.1	7.7	7.5	7.1	10.1	9.4	10.0	9.9	9.5
Other services															
Public administration, defense, sanitary, etc.	4.2	4.2	4.6	4.2	3.3	5.1	6.7	5.8	5.1	5.0	7.1	6.1	6.8	6.9	6.5
Education	2.0	1.7	2.5	2.3	2.3	3.2	3.9	4.3	4.0	3.9	5.2	5.5	5.7	5.5	5.3
Health	1.1	1.0	1.5	1.4	1.4	1.2	1.7	1.7	1.6	1.4	1.9	1.9	1.9	1.8	1.7
Other personal and household	1.8	1.7	2.0	1.8	1.6	2.2	2.5	2.5	2.1	2.1	2.8	2.5	2.7	2.7	2.6

Source: Calculated from Appendix S, Table S.1.1.

contribution of commercial agriculture has more than doubled between 1965 and 1978.

It is apparent that the instability in the share of individual sectors is due, at least in part, to the substantial variations which can occur in the value added of the mining sector valued in current prices. It is therefore instructive to examine the relative sectoral shares when mining activity is excluded. Table 3.4 shows the percentage sectoral composition of non-mineral GDP. It is immediately seen that a much more stable pattern emerges. Thus the share of subsistence agriculture showed a fairly steady decline, a trend which was reversed only by the negative growth rates of total GDP in the post-1974 period. Commercial agriculture's share increased significantly, but by no means as large as was suggested by Table 3.3. The share of manufacturing rose substantially, though the major part of this was concentrated in the immediate post-Independence years. Initially small, electricity and water increased its relative share, almost entirely due to the major investments in hydro-electric power generation at Kariba and Kafue, which have enabled Zambia to reverse its position as a net importer of power at Independence in 1964, becoming a significant exporter of electricity by 1977 (3). A substantial reduction is seen in wholesale and retail trade, due to various factors such as a greater concentration in state-owned trading companies operating on smaller margins, and a fall in the volume of imported goods. The sharpest decline appears to have occurred in the construction sector which fluctuated during the entire period, but fell from 10.4 per cent of

Table 3.4 Structure of non-mineral GDP by kind of economic activity, 1965-79 (current prices)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
	(Percentages)														
Agriculture - commercial subsistence	4.8	5.2	4.3	3.7	4.0	5.1	5.8	6.5	5.8	5.3	4.6	6.0	6.1	5.7	5.0
Manufacturing	18.5	17.7	14.8	13.8	13.9	11.6	11.1	10.3	10.9	10.3	10.5	11.1	11.8	12.4	12.8
Electricity, gas, and water	11.2	14.5	14.6	16.3	16.5	15.8	16.4	17.7	18.1	18.7	18.3	17.2	17.5	19.5	19.6
Construction	1.3	1.5	1.4	1.9	2.1	2.4	2.5	3.0	3.0	3.2	3.1	3.0	2.8	2.5	2.5
Wholesale and retail trade	10.5	12.4	10.8	10.4	11.0	11.0	10.7	9.7	9.5	9.9	11.0	11.6	10.4	7.7	5.9
Hotels and restaurants	19.2	15.9	17.8	18.8	13.9	14.5	12.3	12.5	13.0	13.2	9.7	9.7	10.1	10.9	11.6
Transport and communications	1.1	1.3	1.2	1.6	1.9	1.8	1.8	1.8	1.7	1.7	1.8	1.9	1.8	2.0	2.2
Financial and business services	7.3	6.6	8.1	6.8	6.2	6.0	6.8	6.2	6.0	6.0	6.5	7.4	7.6	7.3	7.6
Other services	7.2	6.8	8.0	8.2	9.9	10.7	10.6	10.1	11.1	10.6	11.7	11.3	11.3	11.3	11.5
Public administration, defense, sanitary, etc.	7.1	7.5	7.1	6.8	6.3	8.0	8.8	7.6	7.6	7.4	8.2	7.4	7.7	7.9	8.0
Education	3.3	3.0	3.9	3.7	4.4	4.9	5.2	5.9	6.1	5.8	6.0	6.7	6.5	6.3	6.4
Health	1.9	1.8	2.3	2.3	2.7	1.9	2.2	2.3	2.4	2.1	2.2	2.3	2.1	2.1	2.0
Other personal and household	3.1	3.1	3.1	2.9	3.1	3.5	3.3	3.3	3.2	3.1	3.2	3.0	3.0	3.1	3.2

Source: Calculated from Appendix S, Table S.1.1.

non-mining GDP in 1977 to 5.9 per cent two years later. The decline in construction activity is due in part to the severity of economic recession in Zambia; but it is accentuated by the fact that in the immediately preceding years value added was increased by the construction of the Tanzania-Zambia railway, and the completion of the Kariba and Kafue power complexes. This is an indication of one effect which single large projects can have on the economies of less developed countries.

Some increase has occurred in the share of financial, business, public and personal services, rising from 22.8 per cent to 31.1 per cent between 1965 and 1979. The increase was by no means uniform: financial and business services rose quite significantly while "other personal and household services" showed very little change. Even in the services related to government expenditure the pattern was not uniform. The broad grouping "Public administration, defence, sanitary and other services" showed almost no change overall, with health services following a similar pattern. On the other hand the share of education services is seen to have increased markedly, illustrating clearly the priority given by the authorities to developing the education system.

The broad trends discussed in the preceding paragraphs are confirmed by Table 3.5 which shows the growth rate of the major sectors for selected periods. These figures are based on GDP which has not been adjusted for variations in the terms of trade, an adjustment which makes a very substantial difference to the apparent

Table 3.5 GDP by kind of economic activity: sectoral trend growth rate (a), 1965-79

(Percentages)

	1965-70 (b)	1970-74	1974-79	1965-79 (b)
Total GDP	1.83	3.62	-0.92	2.00
Agriculture				
Commercial	4.15	5.18	-2.44	4.62
Subsistence	0.59	0.98	2.47	1.33
Mining and quarrying	-5.37	1.39	-1.03	-1.75
Manufacturing	10.92	8.21	-2.88	4.39
Electricity, gas, and water	30.15	24.93	6.20	21.59
Construction	-0.41	6.07	-3.76	3.91
Trade, hotels, and restaurants	2.42	1.97	-4.58	0.14
Transport and communications	1.68	0.90	3.34	2.01
Financial and business services	12.02	8.57	-0.73	6.91
Community, social and personal services	9.20	3.10	1.79	5.56
<u>Memorandum item:</u>				
Non-mineral activity	5.35	4.49	-0.88	3.52

Source: Appendix S, Table S.1.2.

- (a) Exponential trend growth rates - see Appendix III.3.
(b) Data for the period 1965-69 was estimated using implicit deflators as noted in Appendix III.1.

performance of the Zambian economy as was noted in section 3.2. Nevertheless the evidence is of an increasingly unstable economic performance. Total GDP grew at a trend rate of 2.0 per cent during the entire period, somewhat below the growth rate of population of over 3 per cent. The apparent improvement in the period 1970-74 is almost entirely due to a temporary increase in the value added of the mineral sector; the trend growth of non-mining activity falling marginally from the rapid rate of 5.4 per cent to 4.5 per cent in the first two periods. Manufacturing grew very rapidly indeed during both these first two periods, and it was only with the emergence of the foreign exchange constraint from 1975 onwards, that the sector showed some contraction. It is evident that a substantial reversal in Zambia's economic progress occurred during the second half of the 1970s, although the anomalies caused by the method of accounting for mining activity make the exact interpretation of events rather more difficult. Even with the mineral sector removed the post-1974 period was marked by an average annual contraction of nearly 1 per cent.

Table 3.6 shows that Zambia's economic structure is significantly different from that shown by other countries, both developed and less developed. Thus Zambia's agricultural base is smaller than other LDCs, a point certainly true in 1960 when Zambia's agricultural sector accounted for a proportion only half the average of other "middle income" countries. In interpreting these figures it should be remembered that the figures are of weighted averages, so that greater significance is given to the share of the higher income

Table 3.6 Cross country analysis of structure of GDP by kind of economic activity (a), (b), 1960 and 1978

(Percentages)

	Agriculture		Industry		of which (Manufacturing)		Services	
	1960	1978	1960	1978	1960	1978	1960	1978
Low income countries (c)	50	38	17	24	11	13	33	38
Middle income countries (d)	22	16	31	34	22	25	47	50
Industrialized countries (e)	6	4	40	37	30	27	54	59
Zambia	11	17	63	39	4	17	26	44

Source: World Bank, World Development Report 1980, (Annex Table 3).

(a) Weighted averages.

(b) Figures for Zambia are not exactly comparable with previous tables because of differences in definitions.

(c) 38 countries with per capita GNP of US\$360 or less in 1978.

(d) 52 countries with per capita GNP in 1978 of between US\$360 and US\$3,500 (Zambia's per capita GDP was US\$480 in 1978 on the World Bank's method of calculation).

(e) 18 industrialized capitalist countries.

countries. Thus the share of agriculture in Zambian GDP relative to that in countries of a similar average income in the wide-ranging "middle income" group is probably less favourable even than these figures suggest. That the share of agriculture did increase at all is, as has been noted, due more to the weakness in other sectors rather than any inherent strength in agriculture.

Industry in the Zambian economy apparently holds a more prominent share than even in the industrialized countries, but as can be seen from the subsidiary activity, manufacturing, this is due almost entirely to the mining sector. Zambia is unusual among copper producers in that it refines almost all its copper before shipment - a feature of copper extraction which will be discussed in Chapter 5. When manufacturing industry was isolated in this way, Zambia was found to have started from a much smaller base in 1960 than even the "low income" countries. It was also found that the proportionate share of "services" increased rather more quickly than in other countries - an increase of 18 percentage points between 1960 and 1978, compared with 5, 3, and 5 percentage points in the low income, middle income and industrialized countries respectively. Although the manufacturing sector showed a substantial increase in terms of its contribution to GDP, it can be suggested that the initial base was too small to allow manufacturing to become the major stimulus to growth which has commonly been proposed in the development debate.

3.3.2 GDP by type of expenditure. Table 3.7 shows that the structure of GDP by type of expenditure underwent a transformation

Table 3.7 Structure of (a) GDP by type of expenditure and
(b) domestic final expenditure, 1965-79 (current prices)

(Percentages)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
A. Structure of GDP															
Government final cons. exp.	11.4	10.1	12.4	11.7	9.9	16.1	23.6	23.3	21.7	18.9	27.5	25.8	27.3	26.2	26.5
Private final cons. exp.	48.5	46.2	48.9	50.3	39.3	38.3	41.4	39.7	33.3	35.1	51.4	38.0	39.4	45.0	44.6
Increase in stocks	4.9	5.9	5.3	5.2	-2.9	-0.9	4.0	2.3	2.6	10.0	2.5	0.3	0.3	4.4	2.5
Gross fixed capital formation	20.1	23.6	27.0	26.0	20.8	29.7	33.1	33.0	26.6	26.5	38.0	30.9	33.0	24.4	18.5
Exports	51.1	53.4	51.5	50.3	65.1	53.6	42.1	43.5	49.0	49.9	36.3	42.9	39.0	34.0	45.2
Imports	36.0	39.3	45.1	43.4	32.1	36.8	44.2	41.9	33.2	40.4	55.8	37.9	39.0	34.0	37.1
(Total domestic expenditure)	(84.9)	(85.9)	(93.6)	(93.2)	(67.0)	(83.2)	(102.1)	(98.4)	(133.2)	(90.6)	(119.5)	(95.0)	(100.1)	(89.3)	(92.2)
B. Structure of domestic final expenditure															
Government final cons. exp.	13.4	11.8	13.3	12.5	14.7	19.3	23.1	23.7	25.7	20.8	23.0	27.1	27.3	26.2	28.8
Private final cons. exp.	57.1	53.8	52.2	54.0	58.7	46.1	40.6	40.4	39.6	38.8	43.0	40.0	39.3	45.0	48.4
Increase in stocks	5.7	6.9	5.7	5.5	-4.4	-1.0	3.9	2.4	3.1	11.1	2.1	0.3	0.3	4.4	2.7
Gross fixed capital formation	23.7	27.5	28.9	27.9	31.0	35.7	32.4	33.5	31.6	29.3	31.8	32.5	33.0	24.4	20.1

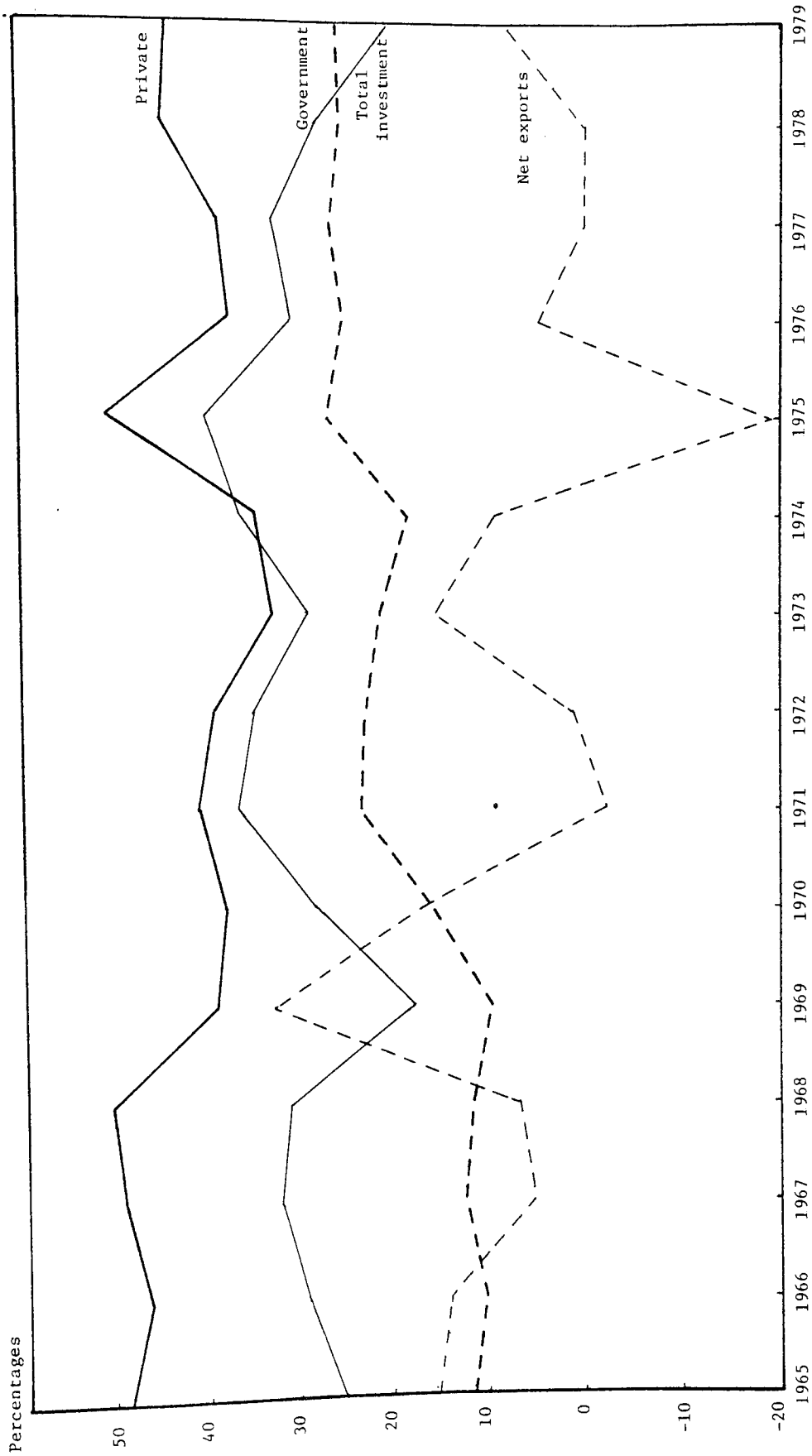
Source: Calculated from Appendix S, Table S.1.3.

during the period 1965 to 1979. As in the previous section it must be noted that the trends are seriously affected by the behaviour of export earnings. As the terms of trade have moved against Zambia, the contribution of net exports to GDP has declined (4). The effect of the movement of net exports on the proportionate share of other types of expenditure is shown clearly by Figure 3.1. The decline in the relative share of net exports was by no means uniform, since a significant though temporary reversal of the trend occurred in 1969, 1973/4, 1976 and 1979. It is evident that there was a secular decline in the share of net exports, although statistically the results are not strongly significant (5).

The only type of expenditure whose relative share in GDP consistently increased was Government final consumption expenditure, which doubled over the period 1965 to 1971, and increased gradually in subsequent years with the exception of a small decline in 1973 and 1974 (corresponding to the rise in net exports). The proportionate share of gross fixed capital formation was apparently high for a less developed country (see Table 3.8 below), but for reasons peculiar to Zambia, the level of net investment was rather more modest (see Bell (1981b)). However, even this measure of net investment varied considerably, about an upward trend until 1975; thereafter the proportion dropped quite steeply, particularly in 1978 and 1979.

From the foregoing it might be expected that private final consumption expenditure would have declined in the years up to

Figure 3.1 Proportionate structure of expenditure on GDP (current prices)



Source: Table 3.7.

1974 with a possible recovery thereafter. In the period 1965-68 a fairly relaxed demand management policy was followed, with the result that private and government final consumption maintained a fairly constant share. Gross fixed capital formation was able to achieve a fairly rapid relative increase, and this was offset by an increase in the level of imports. Restrictive demand management policies introduced in 1969 produced a marked shift in most of the relative shares, although a large part of this is explained by the exceptionally strong performance of the export sector under the influence of high copper prices. In the years 1969-73 there is some evidence of a decline in the share of private consumption with an apparent though temporary recovery in 1975, and a stronger rise in 1978 and 1979.

The behaviour of individual types of expenditure is very heavily influenced by the movements in exports. Therefore it is instructive to examine the proportionate structure of domestic final expenditure, as is done in part B of Table 3.7. Immediately the trends become rather clearer. The late 1960s are characterized by relatively low government consumption, high but slowly falling private consumption, a high level of investment in inventories, and an initially high and rising relative share of gross fixed capital formation. The 1970s are seen clearly to be marked by a rise in government consumption, by the maintenance of a very high rate of gross investment until 1978, and gradual decline in private consumption which recovers also in 1978. Part of the reason for the sharp changes in these proportionate shares must be seen in the very

weak performance of the growth of gross domestic product in the late 1970s (in this case the use of constant price levels makes very little difference to the conclusions noted above - see Appendix S, Table S.1.5.).

Table 3.8 shows the trend growth rates of the principal categories by final expenditure on GDP. The first period, 1965-70, was one of fairly strong growth in the components of final domestic expenditure, gross fixed investment showing the most rapid average growth of almost 12 per cent annually, with government consumption rising at about 8 per cent annually. Total final expenditure also grew at a fairly rapid rate, but since exports rose rather more rapidly than imports the net effect was that the growth of GDP was restrained to only 1.8 per cent per annum on average. The next period, 1970-74, apparently is one of more rapid growth, with GDP growing at nearly 4 per cent on average. However a closer examination of individual components suggests that the growth in this period was rather less firmly based than in the earlier years. The volume of gross fixed investment fell at an annual rate of over 1 per cent, the growth of export volumes declined from 3 to 1 per cent, and private consumption showed almost no overall change. The apparently strong performance of total domestic final expenditure is seen to have been maintained by the continued expansion of government final consumption and a high level of stock accumulation. With exports showing very little growth, the rate of average expansion of total final expenditure of 2.4 per cent translates to the rather higher GDP rate because of the decline in the real value of imports.

Table 3.8 Trend growth rates of GDP by type of expenditure
in 1970 prices, 1965-79 (a)

(Percentages)

	1965-70 (b)	1970-74 (c)	1974-79 (c)	1970-79 (c)
Government final consumption	8.1	5.2	-1.0	1.9
Private final consumption	2.9	0.2	-4.1	-1.4
Gross capital formation (d)	6.0	5.8	-15.1	-5.8
(Gross fixed capital formation)	11.8	-1.2	-16.1	-11.4
Total domestic expenditure	4.6	3.3	-6.9	-2.0
Exports	3.1	1.0	2.4	2.2
Total final expenditure	4.1	2.4	-3.3	-0.3
Imports	7.8	-1.0	-12.6	-6.7
GDP	1.8	3.9	-1.1	1.5

Source: Calculated from Appendix S, Table S.1.4.

- (a) See Appendix III.3.
- (b) Based on 1965 prices (old SNA).
- (c) Based on 1970 prices (new SNA).
- (d) Includes increase in stocks.

In the last three periods, 1974-79, there were large reductions in all components except exports. It is ironic that while most of the foregoing analysis has indicated that the source of Zambia's economic difficulties lies in the loss of export earnings, it should emerge that the export sector should be the only component of final expenditure to show a consistently positive growth rate in terms of volume. The explanation lies in the loss of current purchasing power of these exports due to the declining terms of trade. Most serious for the prospects of growth was the huge decline in the level of gross fixed capital formation - a trend decline of over 16 per cent annually between 1974 and 1979, or a total of 57 per cent in real terms. Government final consumption expenditure fell by an average 1 per cent annually during this period, an indication that the Government succeeded in restraining the real level of its expenditure, particularly in the period from 1978 onwards, when a stabilization programme with the IMF was in force. However, the decline in the consumption of the private sector fell rather more sharply. The decline in all components of domestic expenditure results in an overall trend decline of nearly 7 per cent. This is translated to a trend decline in GDP of 1.1 per cent annually, only by the growth in the volume of exports and the rapid decline of imports, which by 1979 were little more than half their real value in 1972.

The international comparison in Table 3.9 provides further evidence of the openness of the Zambian economy. Gross exports comprised well over one-half of GDP in 1960 compared with only

Table 3.9 International comparison of GDP by type of expenditure and growth rates of principal components, 1960-78 (a)(b)

	Public consumption		Private consumption		Gross domestic investment (c)		Gross exports		Net exports	
	1960	1978	1960	1978	1960	1978	1960	1978	1960	1978
A. Structure: percentages of total										
Low income countries (d)	9	12	80	73	14	21	10	12	-3	-6
Middle income countries (e)	11	13	69	65	21	25	15	21	-1	-3
Of which: Zambia	(11)	(25)	(48)	(44)	(25)	(31)	(56)	(32)	(16)	(--)
Industrialized countries (f)	15	18	63	60	21	22	12	18	1	--
	Public consumption		Private consumption		Gross domestic investment		Total GDP			
	1960-70	1970-78	1960-70	1970-78	1960-70	1970-78	1960-70	1970-78		
B. Growth rates: annual average rates of change (percentages)										
Low income countries	4.5	3.7	3.9	3.1	4.6	3.6	3.9	3.9		
Middle income countries	6.4	7.4	5.3	4.9	7.6	7.2	6.0	5.7		
Of which: Zambia	(11.0)	(2.3)	(6.9)	(-2.7)	(10.6)	(-2.7)	(5.0)	(2.3)		
Industrialized countries	4.8	3.8	4.3	3.5	5.6	1.5	5.1	3.2		

Source: World Bank, World Development Report 1980 (Annex Tables 2, 4, and 5).

- (a) Weighted averages.
 (b) Figures for Zambia are not exactly comparable with previous tables because of differences in definitions and use of different time periods.
 (c) Includes increases in stocks.
 (d) 38 countries with per capita GNP of US\$360 or less in 1978.
 (e) 52 countries with per capita GNP in 1978 between US\$360 and US\$3,500; Zambia's per capita GNP was US\$480 in 1978 according to the source.
 (f) 18 industrialized capitalist countries.

15 per cent for other "middle income" countries, and although the proportion fell to 32 per cent (for Zambia) by 1978 it was still markedly in excess of the average for other countries. Zambia is different from other LDCs in that it maintained a positive balance in terms of its net exports, and although this had decreased to zero by 1978 it is noted that the "average" less developed country relies on a small net deficit of international flows of goods and services. Zambia devoted a relatively high proportion of GDP to gross domestic investment, although it will be suggested at a later stage that Zambia had an abnormally high rate of capital consumption for a less developed country, and that it is therefore possible that the net annual increment to capital stock was no higher than in other LDCs. Zambia also had a very much lower private consumption level than other countries. Indeed with the exception of the five countries described in 1978 as capital surplus oil exporters (6), Zambia was the only country in 1960 to have a relative private consumption level of less than 50 per cent, while in 1978 only two countries were found to be below this level (7). In 1978 the industrial countries' private consumption ratios fell in the range 53 to 64 per cent. The low private consumption and declining gross export levels in Zambia were compensated by an exceptionally high level of government final consumption expenditure, which in 1978 was exceeded by only 7 LDCs and one industrialized country (8). This occurred in spite of the much more rapid growth in other countries of public consumption during the 1970s, indicating that the structural change occurred in Zambia during the 1960s, thus confirming the point made previously in this section.

In 1960, before Independence, and in 1978, Zambia demonstrated considerable structural variations from the norm as represented by average figures for other less developed countries. However the structural differences themselves change between 1960 and 1978 as illustrated by the differences in the growth rates of the principal expenditure components of GDP (see Table 3.9, part B). Public consumption in Zambia grew much faster than the average between 1960 and 1970, and the growth of both private consumption and gross investment were above average in this period (although because of low export growth and high imports, GDP grew rather less quickly). After 1970 the growth rate in Zambia of all these principal components fell below the average - indeed it was only public consumption which maintained a positive rate.

3.3.3 Cost structure of GDP. Further evidence of structural change in the Zambian economy appears in Table 3.10. There was a substantial increase in two cost components: the compensation of employees which increased fairly steadily, with a large rise in 1975 and a smaller decline in 1979; and in relative share. It should be noted with reference to the latter, that a significant discontinuity in the series occurs in 1970 with the change to the revised System of National Accounts (SNA), which incorporated certain definitional changes regarding the consumption of fixed capital. Under the former SNA the proportion of GDP costed to capital consumption was 9.3 per cent, a difference of 1.4 percentage points from the figure given in Table 3.10. In spite of this change it is evident that there was a real increase in the relative level of capital consumption.

Table 3.10 Proportionate cost structure of gross domestic product - current prices, 1965-79

(Percentages)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Compensation of employees	33.4	33.1	37.8	36.1	29.9	37.7	47.8	45.9	42.2	40.7	50.6	45.7	47.3	47.2	42.1
Operating surplus	44.7	45.3	38.8	37.6	41.7	46.3	33.6	34.4	40.7	43.6	26.6	32.1	28.9	26.7	35.6
Consumption of fixed capital	7.7	7.2	8.0	8.3	8.2	10.7	13.7	14.5	13.3	11.5	15.3	13.8	15.1	15.0	14.8
Indirect taxes	14.2	16.5	16.2	19.0	21.4	6.8	7.2	7.7	6.6	7.0	13.1	12.0	12.9	13.0	11.6
Less subsidies	0.1	2.1	0.9	1.1	1.2	1.5	2.3	2.4	2.8	2.9	5.7	3.6	4.2	1.9	4.1
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from Appendix S, Table S.1.6.

The component which was affected most consistently by these increases is the level of operating surplus. The decline in this component is even more pronounced when it is considered that there was a transfer from "indirect taxes" to "operating surplus" when the Government changed from a system of royalty (i.e., indirect) taxation to an entirely profit-based (i.e., direct) system. This change accounts for the sharp fall in indirect taxes in 1970; the subsequent rise in 1975 resulted from the introduction of a sales tax. It is of some consequence (in view of the government's programme with the IMF), that the level of subsidies relative to GDP fell from a maximum of 5.7 per cent in 1975 to 1.9 per cent by 1978, although the proportion rose in 1979.

The decline in operating surplus is larger than is at first apparent. Operating surplus, by definition, includes the entire output of the subsistence sector, but as this is entirely an imputed value it does not represent any form of financial flow; that is the output or income created by the subsistence sector does not enter the "money" economy. With the value added by the subsistence sector removed from both GDP and operating surplus, the net share of operating surplus is found to fall from 38 per cent in 1965 to 18 per cent in 1978. If the concept of the investible surplus is employed, then this decline in the level of "net" operating surplus in the economy must be viewed with some concern, since a proportionally smaller volume of resources for investment was available in the later years of the period under review. It remains to be

seen whether the rise in the proportion of operating surplus in 1979 represents a permanent reversal of the trend.

3.4 The structure of national income and its relation to GDP

Three principal aggregates are identified under the revised System of National Accounts: domestic factor incomes, national income and national disposable income. The exact relationships between the three may be seen in Appendix S, Table S.1.7. "Domestic factor incomes" provides an identification of the level of income accruing to the principal factors of production resulting from domestic productive activity, and valued at factor cost. The relationships and behaviour of the two principal components (compensation of employees and operating surplus) were discussed in the previous section, and the decline of the proportionate share of operating surplus to GDP was stressed. This pattern is confirmed by the ratio of operating surplus to domestic factor incomes, which declined from 50.4 to 31.8 per cent between 1965 and 1978 (after the exclusion of subsistence farming).

"Net factor income from abroad" consists in the case of Zambia entirely of property and entrepreneurial income, and was negative, reflecting high levels of company profit remittances in the years immediately after independence, and, in more recent years, increased debt service flows. In real terms, however, this net outflow declined by over 50 per cent between 1965 and 1978 (9). In contrast, the level of "other current transfers from abroad (net)" has increased very substantially from levels which were initially, in

1965, almost negligible; this is probably due to the growing number of "expatriate" workers employed in Zambia on short-term contracts, who are permitted to remit a substantial proportion (one third or more) of their earnings. There is almost no corresponding inflow of earnings or remittances from abroad. These transfers and payments abroad constitute a considerable drain on the country's domestic incomes, and provide an explanation for national disposable income being only very slightly higher than aggregate domestic factor incomes in spite of the high level of net indirect taxation.

The variations in the levels of net factor incomes and current transfers from abroad, might be thought to be the principal reason for the variation and gradual decline of the ratio of national disposable income to GDP which may be seen from part (b) of Table 3.11 (10). However, the comments of the previous section concerning the rapid growth of the "consumption of fixed capital" should be recalled: its relative share in GDP increased from 7.7 to 14.8 per cent. On the other hand net payments and transfers abroad increased by only 0.4 percentage points (from 6.7 to 7.1 per cent). Although Zambia's debt service and other current account balance of payments obligations certainly increased during the 1970s they remained stable relative to GDP.

The most striking feature of the analysis presented by Table 3.11 is the significant structural change which occurred in the allocation of national disposable income. The secular increase of the share of government final consumption expenditure noted in the

Table 3.11 Structure of national disposable income; and national income aggregates as proportions of GDP, 1965-79

(Percentages)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
A. Proportionate structure of national disposable income															
Government final consumption	13.3	11.9	14.3	13.8	11.7	20.5	32.1	32.0	28.6	23.8	36.9	33.7	35.7	33.7	34.3
Private final consumption	56.7	54.5	56.4	59.5	46.6	48.8	56.4	54.5	44.0	44.1	69.0	49.6	51.4	58.0	57.6
Saving	30.0	33.6	29.2	26.7	41.6	30.7	11.6	13.5	27.5	32.1	-5.9	16.6	12.9	8.2	8.1
B. National income aggregates as percentage of GDP															
Domestic factor incomes	78.2	78.4	76.7	73.7	71.6	84.0	81.3	80.3	82.9	84.4	77.2	77.7	76.2	73.8	77.7
National income	86.0	86.0	86.5	86.8	88.2	86.7	82.6	80.1	81.5	83.9	79.7	80.6	79.7	80.4	80.4
National disposable income	85.5	84.8	86.6	84.5	84.3	78.5	73.5	72.9	75.8	79.6	74.5	76.5	76.6	77.5	77.4
Saving	25.7	28.5	25.3	22.5	35.1	24.1	8.5	9.9	20.8	25.6	-4.4	12.7	9.8	6.4	6.3

Source: Calculated from Appendix S, Tables S.1.7 and S.1.1.

previous section appears even more pronounced. The major part of the increase appears to have occurred in 1970 and 1971, with first private consumption expenditure and then the level of savings declining in response to the increase in the demands of the government sector. In subsequent years the level of private consumption expenditure was quickly restored, at the expense of an apparently permanent decline in the relative level of net domestic saving. These comments should be qualified by reference to Table 3.8 which shows a real decline in the levels of both government and private final expenditure in the period after 1974 with the latter showing the sharpest fall. Nevertheless it is undoubtedly the case that there was a substantial and permanent shift from saving to government final consumption in the distribution of national disposable income.

Once again the year 1975 appears as a major discontinuity in the series. The combination of very high copper prices in 1974 and very low ones in 1975, a large increase in the level of imports, an extremely high government budget deficit creating an inflationary environment, and the continuation of buoyant demand, is reflected in a most pronounced fashion in the large discrete rise in both government and final consumption expenditure. The result was that domestic savings were actually negative in that year, following the previous year in which savings relative to national disposable income had been at their highest level during the 1970s. The Zambian economy in 1975 seems to have entered a period of recession with a

structure insufficiently well balanced to provide the basis of recovery without a major reversal of the terms of trade.

3.5 Employment

The growth and structure of employment illustrated in Table 3.12 reflect the limited growth of the economy and the unbalanced path it has followed. Although total employment grew by an annual average of 1.5 per cent during the period 1965-79, it can be seen that, like the expansion of GDP, employment rose steadily, if rather slowly, during the years from 1965 to 1974, but thereafter declined. Employment in mining followed the national average, almost exactly maintaining its sectoral share. The weakening performance of manufacturing is reflected in the growth path of employment which fell away from a very rapid rate of growth initially to become almost static by the end of the 1970s; indeed the preliminary estimates indicate that manufacturing employment fell quite sharply in 1978 and 1979. A sharp decline of employment in the construction sector, a result of the completion of the Tanzania-Zambia railway and the hydro-electric power projects mentioned earlier, resulted in a substantial fall in its proportional share. Further evidence of severe structural imbalance comes from the continual decline in the level of employment in the agricultural sector (commercial farming only), and the resulting large fall in its proportional share. In direct contrast financial and community services have shown very rapid increases in employment, with fairly rapid growth even in the years of recession after 1974. The combined proportionate share of

Table 3.12 Growth and structure of employment, 1965-79

(Percentages)

	Trend growth rates (a)				Structure (b)	
	1965-70	1970-74	1974-79	1965-79	1967	1977
Agriculture	-0.3	-2.6	-0.4	-0.5	11.3	8.7
Mining	1.5	3.1	-1.6	1.4	17.5	17.2
Manufacturing	6.3	3.3)	0.6)	2.1	10.4	12.4
Electricity and water	-2.6	9.5 )	)	)	0.9	2.0
Construction	2.7	1.4	-12.2	-2.5	21.6	13.5
Distribution, hotels, etc.	4.1	1.0	-1.1	1.0	10.1	8.8
Transport	9.0	0.5	-0.4	1.2	6.5	5.5
Financial services)		15.9	3.2	10.1 (c)	2.2	4.9
Community services)	0.5	4.2	12.1	4.4 (c)	19.5	26.8
Total	<u>1.8</u>	<u>2.6</u>	<u>-1.5</u>	<u>1.5</u>	<u>100.0</u>	<u>100.0</u>

Source: Calculated from Appendix S, Table S.2.1.

(a) For exponential trend average growth rate; see Appendix III.3 for method.

(b) Percentage share of total employment.

(c) 1967-79

these two sectors rose by over 10 percentage points in the decade up to 1977. Thus, the administrative infrastructure has developed rapidly and may be in excess of the country's requirements and ability to sustain in the context of the serious deterioration in the terms of trade.

Labour productivity has been a source of some concern: the data of Table 3.13 and the fuller analysis of Appendix Table S.2.4 show a rather mixed performance across sectors. There undoubtedly was a significant decline in the mining sector, though this was probably due to technical or production factors, such as declining ore grades or ageing capital stock. The fall in mining productivity is transmitted into the index of total value added per worker which is seen to have been fairly static after an initial fall in the early years of Independence. With mining activity excluded the performance of labour productivity appears quite impressive, with an upward if erratic movement in the index until 1976 when the loss of production and apparent low income elasticity of demand for labour combined to produce a fall in value added per worker. Individual sectoral performance was uneven, with very marked gains in commercial agriculture offsetting the decline in employment levels in that sector. Pronounced increases of productivity in the electricity and water sector are largely a result of heavy investment in hydro-electric generating capacity; and the decline in later years is probably due to the recruitment of labour in the anticipation of expanding demand which was not realized.

Table 3.13 Indices of value added per worker in 1970 prices,
1965-79 (selected years)

(1970 = 100)

	1965	1968	1970	1973	1976	1979
Total	106.3	101.8	100.0	100.0	116.0	101.2
Total excluding mining	68.1	95.4	100.0	106.4	126.4	112.6
Agriculture (commercial)	74.1	86.9	100.0	122.1	163.2	101.8
Mining	158.1	109.7	100.0	91.2	97.8	85.6
Manufacturing	83.1	105.4	100.0	112.0	104.0	) 117.6
Electricity and water	19.8	45.7	100.0	138.8	125.8	
Construction	131.5	104.8	100.0	107.8	238.9	182.2

Source: Calculated from Appendix S, Table S.2.4.

It is felt that the study of productivity is of only peripheral interest in analyzing the economic conditions which prevailed in Zambia in the late 1970s, partly because attempts to increase labour productivity in the modern sector of the economy would have been inimical to employment creation, and partly because labour productivity must be treated as a passive measure of what was occurring in other economic variables as employment and output, and is of course influenced by the techniques of production embodied in new investment. If the first of these two points is accepted, and employment creation is given precedence over productivity then the necessary corollary is that real wages per worker will tend to fall over time, if the share of profits is constant. This would not preclude the redistribution of real wages among sectors by varying inter-industrial differentials.

3.6 Industrialization and diversification

Zambia had an exceptionally small industrial base in 1960 (Table 3.6), and the situation had changed little by the time of Independence four years later. But as may be seen from Tables 3.3, 3.4 and 3.5, from 1965 to the early 1970s there occurred a fairly rapid expansion of industrial output, not only in terms of the annual growth rates, but also in the proportion of GDP generated by manufacturing. At the end of the previous chapter it was noted that some observers felt that the rate of economic growth could have been even higher in the few years after 1965 than the quite acceptable rates which were realized but for the occurrence of certain constraints.

In a detailed analysis of the manufacturing industry in these early years Young (1973) reaches similar conclusions. His analysis starts by casting some doubt on the contention that heavy reliance on a primary commodity and substantial instability in the export earnings from that commodity are necessarily associated with a greater degree of general economic instability than in present in, say, the economies of the exporters of manufactured goods. While this is somewhat at variance with the prima facie case established here for a fairly high level of association, Young does acknowledge that the future reaction between the variables seemed rather uncertain.

Young makes out a case for direct government involvement in economic activity, primarily in industry, but not precluding agriculture. This was based on the contention that the system of capitalist enterprise in existence at the time of Independence would be unlikely to mobilize resources in the manner necessary to ensure some measure of diversification; and for a similar reason it was suggested that the market mechanism would not lead to the "full exploitation of interindustry effects". The experience of subsequent years was of increasing government involvement, particularly in the years after the Mulungushi and Matero reforms (11) in which the government's policy of moving through a mixed economy towards eventual complete state ownership was first elaborated. However there is little evidence to suggest that any attempt was made to use the price mechanism in order to stimulate diversification; nor is it apparent that the involvement of government in industrial activity

was expanded into new areas of activity. Most government involvement seems to have taken the form of takeovers (partial or complete) of existing enterprises. The behaviour of these enterprises lies outside the scope of this study, but a recent analysis is made by Turok (1980).

The constraints which were seen to apply to the whole economy by Elliott (1971) were also viewed by Young as applying to manufacturing: the rapid growth of wages, the first signs of capital shortages, the dislocation to traditional transport routes arising from tensions with Zambia's southern neighbours, and an apparent lack of "indigenous enterprise". He also showed that demand for the output of the manufacturing sector was distorted by the presence of the mining sector, because of the high level of consumer demand created by it and because of the mining industry's need for supplies. Nevertheless Young suggested that there was only limited scope for industrial expansion based solely on the home market, and at that time membership of the East African Economic Community was being seriously considered. The application was dropped largely on political grounds (after the Amin coup) and the Community itself was to disintegrate over the following years. Nevertheless it is unlikely that Zambia's industrial base will continue to grow unless international markets are opened: in this respect the independence of Zimbabwe may provide a market for Zambian products, but the converse may also be true in that the resumption of normal relations may see a return to the pre-independence situation of large importance from the South, with a corresponding disincentive to domestic production.

Offsetting these negative features, Young suggested that Zambia had certain advantages, mainly an abundant supply of relatively cheap energy (hydro-electric power from Kariba and Kafue) and a substantial volume of industrial minerals. While the former was certainly been a great advantage, particularly after the oil price revolution, it is suggested that there is only limited scope for extending operations "downstream" from the stage of metal refining, into fabricated metal products, desirable though this may be. There are several reasons for this: firstly, many copper products require relatively sophisticated manufacturing processes involving capital-intensive techniques, large investment and the acquisition of new labour skills, with the consequence that their development can only be expected in the medium to long term. Secondly, many fabricated products are fairly delicate and present severe transportation difficulties. Thirdly, considerable marketing expertise would be necessary in order to break into markets with well established networks of supply and demand, that is, it will be difficult to penetrate existing markets. Fourthly, most potential importing (industrial) countries imposed import tariffs on fabricated metal products even though there may be none on the importation of refined but otherwise unprocessed metal. The combination of these difficulties persuaded Zambia like some other copper producers to enter copper fabrication ventures, not within its own borders but in a country of final destination (France) with supply of the metal to the plant being tied to Zambian copper (12).

The recurrent theme in Young's study was the need to utilize Zambia's non-mineral natural resources, which he perceived as a persistent negative feature of the early years of independence. His expectation was that "the country's considerable latent agricultural and forest resources will probably be exploited on a much larger scale than could be done during the brief period under consideration" (i.e., the years up to about 1970). The extent to which this was achieved can to a certain extent be assessed from Table 3.14, as well as by considering the rates of growth of the agricultural sector in Table 3.5. From the latter it is noted that despite a fall in the second half of the 1970s the output of the commercial agriculture sector was one of the faster growing sectors. (The subsistence sector is not considered since by definition its output is not marketed and is therefore not available as an input to industrial processes). It is of interest to note from Table 3.14 that the industry with the best overall growth record, textiles, is one which does draw on the output of a domestically produced crop, cotton, although it must be noted that a substantial proportion of its input continues to be imported. Cotton production increased fourfold in as many years up to 1978/9 thus maintaining supplies to an industry which would probably otherwise have suffered as severely as many others in the difficult economic condition which prevailed from 1975 onwards.

The picture which emerges from Table 3.14 is of fairly rapid growth in the years up to 1974, with a corresponding proportional increase in the share of manufacturing in GDP, but with a reversal

Table 3.14 Trend growth rates (a) and proportionate structure of manufacturing by industry, 1965-78
(Percentages)

	Share of total output by industry				Growth rates		
	1965 (b)	1970 (c)	1974 (c)	1978 (c)	1965-70 (b)	1970-74 (c)	1974-75 (c)
Food, beverage, tobacco	40.8	52.9	45.3	46.5	13.8	0.6	1.3
Textiles, etc.	8.1	8.6	9.0	13.9	17.3	12.0	4.4
Wood, etc.	5.0	4.3	5.2	3.0	9.2	12.1	-15.4
Paper, etc.	4.4	4.3	2.9	4.4	17.2	-1.1	4.1
Rubber products, plastics, chemicals and petroleum	7.5	8.7	14.4	16.1	22.8	22.0	-0.5
Non-metallic mineral products	12.7	7.1	4.9	5.0	0.3	-1.7	-4.7
Basic metal products	9.5	1.9	1.7	1.9	-20.3	2.9	-1.6
Fabricated metal products	11.9	11.8	16.2	8.8	11.4	15.5	-17.7
Other	0.2	0.2	0.4	0.4	--	--	--
Total	100.0	100.0	100.0	100.0	10.9	8.0	-4.3
<u>Memorandum items:</u>							
Manufacturing as proportion							
(a) of total GDP	6.6	10.1	12.1	10.2	--	--	--
(b) of non-mineral GDP	11.2	16.4	18.0	15.1	--	--	--
Growth rate of							
(a) GDP	--	--	--	--	1.8	3.5	1.2
(b) non-mineral GDP	--	--	--	--	5.7	4.6	0.2

Source: Calculated from Appendix S, Table S.1.8.

- (a) Exponential trend annual growth rates: see Appendix III.3.
 (b) Based on constant price of 1965 (former SNA).
 (c) Based on constant price of 1970 (revised SNA).

after 1975. However the pattern of the structural changes is not indicative of a balanced programme of diversification. For instance the industrial group with the largest increase in its proportional share of manufacturing output was "rubber products, plastics, chemicals and petroleum products" which is very heavily reliant on imported raw materials. On the other hand, industries like non-metallic mineral products, basic metal products and fabricated metal products, all of which may be expected to rely on locally produced raw materials have each shown substantial contraction, in both proportional and absolute terms.

On the basis of this brief analysis a prima facie case appears to exist for concluding that although some economic diversification may have been achieved in the sense of an increased proportion of GDP coming from the industrial sector, it has been singularly unsuccessful in realizing one of the primary objects - that of reducing the economy's reliance on the mineral sector as a source of export earnings. Moreover the development of import-intensive industries at the expense of manufacturing activity with a high degree of "backward linkage", (i.e., using locally produced raw materials) almost certainly increased the economy's vulnerability to instability in export earnings. Certainly this is true of manufacturing industry itself, as shown by the overall decline (very substantial in some cases) in the value added of the manufacturing sector, which contrasts with the positive rate of growth in total GDP in the period from 1974 to 1978.

3.7 Economic dualism in Zambia

If there is one feature about the Zambian economy on which most discussions agree it is the extent of dualism which is present, and evident to even the most casual observer.

Comments by Baldwin (1966) were quoted in Chapter 2 on the existence and causes of economic dualism, and he suggested that it arose because of the need to import both capital and skilled labour. His basic agreement was that dualism was essentially technological in origin caused by the imposition of a technically sophisticated mining industry on a low productivity, traditional economy. The pattern created by this became firmly established within the economy, so that after half a decade of Independence, Jolly was to write:

"It will already be clear how much the distribution of income has been influenced by the influence of manpower scarcity and the employment of expatriates. Absolute differentials within the wage and salary structure have increased enormously. Inequalities have also increased between those with wage-earning jobs and those without - the unemployed in the towns and those dependent on agriculture in the rural areas. This has been the result partly of the widening gap in earnings but also of the slow growth of employment and of the decline in the quality and distribution of government services. In short, the bulk of the wage increases went to paying employed people more than into employing more people..." (Jolly, 1971, pp. 55).

Perceptions have changed little, so that by the end of the 1970s Fry was to argue along the same lines as both Baldwin and Jolly concerning the origins of income distributional inequalities. Fry is quoted at some length since he provides considerable insights and much detailed analysis of the state of inequality in Zambia and its relationship to employment levels.

"Four differentials are identified as fundamental to the pattern of income distribution. These are the rural/urban differential, the local/expatriate differential, the skilled/unskilled differential and sectoral wage differentials.

"In practice, the first two differentials give rise to the greatest problems, since the narrowing of one automatically implies the widening of the other. In terms of policy formulation, however, the latter pair of differentials are also troublesome. If the unskilled workers' minimum wage is set near the level of rural incomes, the skilled/unskilled differential becomes very considerable. Yet, if the unskilled wage is raised so as to reduce the degree of income inequality among wage earners, this serves merely to exacerbate rural-urban inequalities.

"The differentials between wage scales in different sectors cause further difficulties for policy-makers... It is not simply pressures from trade unions that explain sectoral differentials. Instead they are closely related to the technological structures of the various sectors, in particular as these effect the capital intensity of production and the return from expenditures upon training..."
(Fry, 1979, p. 11).

Very similar conclusions are reached by Daniel (1979) in his analysis of mining labour and its effects on Zambian development. He notes that while racial inequalities may have been reduced somewhat, others may have increased, and he stresses the inequalities based on skill and the possession of paid employment, as well as the disparities between urban and rural incomes.

Some measure of the degree of inequality is given in Table 3.15 which shows the Gini coefficients for various areas within Zambia and provides an international comparison of the level of coefficients (13). It will be noted from Part A of the Table that there is a considerable difference between average incomes in the urban and rural areas. This is reflected in a high Gini coefficient for the country as a whole, indicating a fairly high overall level of

Table 3.15 Gini ratios: Zambia and international

Part A	Year	Average income (Kwacha)	Comparative distributions of income and expenditure: Gini ratios	
			Income	Expenditure
Total Zambia	1972-3		0.57	0.44
Urban	1972-3	120	0.58	0.37
Semi-urban	1972-3	98	0.43	0.31
Rural	1972-3	29	0.39	0.34
Copperbelt (Daniel)	1973		0.50	

Part B

International distribution of Gini coefficients (a)	Number of countries
Greater than 0.65	1
0.61 - 0.65	5
0.56 - 0.60	5
0.51 - 0.55	5
0.46 - 0.50	8
0.41 - 0.45	12
0.36 - 0.40	11
0.31 - 0.35	8
0.21 - 0.31	6
0.20 or less	1
Total	62

Sources: Part A: International Labour Office, Narrowing the Gaps, (1977) (Table II.2); Daniel (1979) (Table 2.18); Part B: Todaro (1977) (Table 5.5) based on Ahluwalia (1974a) (Table I.1).

(a) Median (developed and developing countries) is 0.44. Zambia (1969 = 0.49).

inequality. The individual Gini coefficients show a very much higher degree of inequality within the towns than in the rural areas. It is worth labouring the point to stress that in the urban areas incomes are high on average but unequally distributed (or high dispersed), while in the rural areas incomes are low but rather more equally spread. Any single statistical measure of income distribution in this situation is not unambiguous since it is not immediately clear which is the more equitable. The lower Gini coefficients for expenditure reflect the lower average propensity to consume in high income households. Daniel (1979) provides a further measure of the Gini coefficient for the Copperbelt which suggests that income distribution in this economically most significant province of Zambia is slightly less unequal than in other urban areas, though it should be noted that the Copperbelt province does contain some non-urban areas.

The International Labour Office (1977) also produced a Gini coefficient for urban areas in Zambia in 1959 based on data in Baldwin (1966). This suggests that inequality may have increased somewhat in the period 1959 to 1973. Such a phenomenon would be perfectly consistent with previous discussion, if at first a little surprising. It would occur if there had been an increase in the differential between the income of the unemployed and those in formal employment; it would also occur if differentials among earnings in different sectors had increased; and it would be consistent with a rise in the rate of urban unemployment caused by the natural growth of population plus the rate of migration from rural to urban areas.

The distribution of Gini coefficients shown in Part B of Table 3.15 shows that Zambia is among those countries with relatively high degrees of inequality of income distribution. Thus in Todaro's calculations which used Baldwin's data for 1959 Zambia is found to rank twenty-second out of 62 countries arranged in decreasing order of their Gini coefficients. The ILO figure based on observations for 1972-73 would place Zambia in eighth position.

Having examined the extent of inequality in the economy it is instructive to give slightly more consideration to the four differentials identified by Fry (1979) and quoted above. Insufficient evidence is available to state categorically what has happened to the rural/urban income differential. That it exists and is significant is not in dispute but whether it has widened is not clear. Fry presents indices based on studies by Maimbo and Fry (1971) and Fry (1975) which show that there has been a substantial deterioration in the rural/urban barter terms of trade (the real value of a given unit of production compared with a base period); this measure declined by over 20 per cent between 1964 and 1973. It is suggested that further deterioration may have taken place since 1973, because of the continuation of government intervention in fixing agricultural prices and the fact that wholesale prices for agricultural products rose by 67 per cent between 1973 and 1978 whereas the consumer price index for low income households rose by 97 per cent in the same period. However, to offset this Fry notes that the rural/urban income terms of trade, which measures the purchasing power of total production in the rural areas, increased

by about 150 per cent between 1964 and 1972. Thus the evidence is not entirely clear, but it is conceivable that in the years since 1972 with only limited growth of output in agricultural production there may have been little change in the index of the income terms of trade.

Appendix S, Table S.2.2 shows details of earnings levels in the years 1967, 1971, 1974 and 1977. Although statistical discrepancies make exact comparisons difficult it is immediately apparent that there are large differentials between sectors and between "African" or "Zambian" workers on the one hand and "Other" or "Non-Zambian" workers on the other. Table 3.16 indicates the extent of the local/expatriate differentials although it should be noted that the 1971 and 1974 figures are not directly comparable. Nevertheless it is apparent that there exists a large gap between the two groups, but the evidence is that this gap has narrowed since 1967, although there are a few exceptions - possibly temporary adjustments which are eliminated over medium to long periods.

One of the notable characteristics of Table 3.16 is the extent of the variation between sectors in terms of the local/expatriate differential. Thus it is found that in agriculture the differential between African and other workers in 1967 was as high as 12.7 while in community services it was only 3.8. The variation has decreased, but by 1977 it was still fairly pronounced. One of the factors which appears to be responsible for this variation is the extent of concentration of non-African or non-Zambian workers in the total employment

3.16 Earnings differentials between racial/nationality groups (ratios), 1967-77 (selected years)

Part A	1967 Other: African	1971 Other: African	1974 Non- Zambian: Zambian	1977 Non- Zambian: Zambian
Agriculture	12.7	12.0	5.8	5.8
Mining	5.7	4.7	3.9	4.2
Manufacturing	6.8	7.2	5.5	4.9
Electricity and water	7.2	8.3	7.5	5.4
Construction	9.3	9.6	6.1	4.9
Distribution, hotels, etc.	5.9	5.9	5.0	5.0
Transport and communications	4.0	4.2	3.3	2.7
Financial services	5.0	5.2	5.1	3.6
Community and personal services	3.8	3.5	3.2	2.9
Total	6.7	5.8	4.8	4.6
Part B				
Differential between highest and lowest sectoral average earnings				
African	5.3 (a)	4.4 (a)		
Other	3.5 (b)	2.5 (c)		
Zambian			3.8 (a)	4.2 (a)
Non-Zambian			2.5 (a)	3.0 (a)
Total	7.1 (a)	5.1 (a)	4.7 (a)	5.0 (a)

Source: Calculated from Appendix S, Table S.2.2.

- (a) Mining and agriculture.
- (b) Mining and financial services.
- (c) Mining and community and social services.

in each sector which may be seen in Table 3.18. Thus the lower is the proportion of expatriates employed in any sector then the larger is the local/expatriate differential. (Correlation coefficients were calculated between the local/expatriate differential and the proportion of expatriate workers in the sector as -0.338 and -0.577 in 1967 and 1977 respectively). At first sight this result appears paradoxical, but the explanation is thought to lie in the fact that in sectors with large numbers of expatriate workers, the spread of earnings among these workers will be rather higher than in sectors with only a few expatriates, since in the latter case the workers involved will tend to be in the highest paid positions. Thus for instance the relatively few expatriates in agriculture would be farm managers, while in mining there would be substantial numbers of, say, skilled shop floor workers as well as top managers.

Part B of Table 3.16 also suggests that the spread of earnings among African/Zambian workers is rather greater than that among expatriates. This might also be explained by the greater dispersion of skills possessed by the former group and the extent of utilization of these skills in different sectors. For instance Zambian workers in the mines will be more highly skilled than those in agriculture, while expatriates tend to hold similar positions regardless of the industry in which they are employed.

Another point to emerge from Part B of Table 3.16 is the extent of the variation between average earnings in the various sectors. Thus in 1967 average earnings in mining were 7.1 times the level of

those in agriculture, and by 1977 this ratio had decreased only to 5.0. The extent of the variation can be seen in more detail in Table 3.17 where average earnings are presented as proportions of the average for the country as a whole and are then expressed as index numbers with the economy-wide average as the base. Thus it is apparent that mining industry enjoys the highest level of earnings. This must be qualified by two observations: firstly, that the differential between mining and other industries narrowed suggesting that it acted as a standard for other industries, and secondly, that the differential had widened again by 1977, partly a result of substantial wage settlements in the industry, but partly also because of the relative decline in earnings levels in other industries caused by the falling levels of economic activity which were noted earlier in this chapter. Whereas the mines saw some reduction in the volume of output they have realized this by reductions in their labour force. Casual observation would suggest that other industries have restrained their work force largely intact, but on short-time working. The combination of these two factors would help to explain the recent increase in the differential between mining and overall average earnings.

Various factors have already been suggested for the existence of the sectoral differentials, and Table 3.17 provides a basis for testing the proposition that it is due to technological factors. If it is accepted that the level of value added per worker is largely determined by technical factors, then we should find a strong relationship between this measure and the level of average annual

Table 3.17 Value added per worker and average annual earnings: relative levels
in major industrial groups

(As percentage of overall average)

	Value added per worker ($\frac{P_i}{P}$)				Average annual earnings ($\frac{E_i}{E}$)			
	1967	1971	1974	1977	1967	1971	1974	1977
Agriculture (a)	27.4	35.4	44.1	51.8	28.3	31.3	36.1	38.4
Mining	257.2(b)	224.2	206.2	198.3	201.3	159.3	169.1	190.1
Manufacturing	94.4	115.2	114.8	82.5	98.0	103.4	94.4	93.4
Electricity and water	69.4	184.3	276.9	208.6	144.4	101.4	91.7	91.8
Construction	40.6	42.4	45.8	83.0	65.2	68.0	63.0	56.9
Distribution, hotels, etc.	111.2	107.2	117.5	93.9	120.8	92.4	94.3	99.3
Transport and communications	87.2	81.6	69.9	81.5	124.2	129.8	109.7	113.3
Financial services	287.5	297.3	210.0	188.2	100.3	151.9	134.5	124.8
Community and social services	53.5	58.4	52.7	51.4	88.8	76.0	99.9	80.9
Total (c)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from Appendix S, Tables S.2.2 and S.2.4.

- (a) "Commercial" agriculture only.
- (b) Adjusted as explained in Appendix III.1, and therefore not directly comparable with other years.
- (c) Excluding subsistence agriculture, import duties and bank service charges.

Table 3.18 Employment of non-Africans/non-Zambians (a) relative to sectoral and overall employment levels

(Percentages)

	Non-African/non-Zambian employment as proportion of sectoral work force				Index numbers of non-African/non-Zambian employment as proportion of annual level (d), $\frac{X_i}{x}$			
	1967	1971	1974	1977	1967	1971	1974	1977
Agriculture (b)	1.4	1.5	4.2	4.3	14.9	21.1	48.8	58.9
Mining	11.7	9.3	16.6	13.3	124.5	131.0	193.0	182.2
Manufacturing	8.4	7.6	7.0	5.8	89.4	107.0	81.4	79.5
Electricity and water	13.8	10.0	10.6	4.0	146.8	140.8	123.3	54.8
Construction	4.0	4.1	6.1	6.0	42.6	57.7	70.9	82.2
Distribution, hotels, etc.	16.8	12.1	9.5	5.8	178.7	170.4	110.5	79.5
Transport and communications	11.8	7.1	7.2	5.8	125.5	100.0	83.7	79.5
Financial services	33.3	18.1	11.8	7.7	354.3	254.9	137.2	105.5
Community and social services	10.5	7.4	6.7	6.8	111.7	104.2	77.9	93.2
Total (c)	9.4	7.1	8.6	7.3	100.0	100.0	100.0	100.0

Source: Calculated from Appendix S, Table S.2.1.1.

(a) In 1972 the classification was changed from a distinction between "African" and "Other" workers to one between "Zambian" and "non-Zambian" workers. This made particularly large variations in agriculture and mining.

(b) "Commercial" agriculture only.

(c) Excluding subsistence agriculture and domestic service.

(d) e.g., for agriculture in 1967 index number is $(1.4 \div 9.4) \times 100 \% = 14.9 \%$, and so on.

earnings. The data presented shows value added per worker expressed as an index with the economy-wide average as the base for each year. Visual examination of the data suggests that there is some basis for the proposition, although some sectors (electricity, transport, and financial services) are not so readily explained. A simple least squares regression was performed on the following equation:

$$\frac{E_i}{E} = a + b \frac{P_i}{P} \quad (3.1)$$

where E_i is average earnings in industry i

E is average earnings in all industries

P_i is value added per worker (productivity) in industry i

P is productivity in the industry as a whole.

The data of Table 3.17 was used in its percentage form. The results are tabulated in Table 3.19. The results provide some support for the hypothesis, although only two results (for 1971 and 1974) are significant at the 5 per cent level. A further regression was then conducted, adding to equation (3.1) the variable $\frac{X_i}{X}$ which is the index of the proportion of expatriates employed in industry i , expressed as an index of the proportion of expatriates in the whole employed labour force as presented in Table 3.18. Thus the regression model is now:

$$\frac{E_i}{E} = b_0 + b_1 \frac{P_i}{P} + b_2 \frac{X_i}{X} \quad (3.2)$$

The results are presented in Table 3.20, and are seen to show some improvement over equation 3.1. Only in the case of the regression run for 1977 did the coefficients of both $\frac{P_i}{P}$ and $\frac{X_i}{X}$ become significant at the 5 per cent level, and it was only in 1974 and 1977

Table 3.19 Results of regression of equation 3.1

Year	Coefficients		t ratio (b)	Coefficient of determination, R^2
	a	b		
1967	73.2	0.304	1.890	0.3379
1971	54.0	0.373	3.742	0.6666
1974	66.6	0.257	1.862	0.3311
1977	46.1	0.453	2.379	0.4470

Table 3.20 Results of regression of equation 3.2

Year	Coefficients			t ratios		Coefficient of determination, R^2
	b_0	b_1	b_2	(b_1)	(b_2)	
1967	78.8	0.411	-0.135	1.569	-0.537	0.3683
1971	51.5	0.344	0.062	1.656	0.228	0.6696
1974	14.9	-0.138	0.987	-1.108	4.061	0.8216
1977	-1.9	0.248	0.795	1.970	3.721	0.8328

that the relationship was strengthened by the introduction of $\frac{X_i}{X}$. It is suggested that further investigation is necessary to take account of other factors which might cause variation among the sectors and also the effects of the very different economic conditions in each of the four years; for instance, a possible additional factor would be the level of utilization of each industry's capital stock. This is especially true because any index of earnings is more sensitive to variations in economic output than are wage rates.

This discussion of dualism has concentrated largely on the issue of incomes in general and earnings in particular. This is partly because of the ease of devising measures relating to incomes and earnings. This should not be allowed to obscure the fact that there are many other manifestations of dualism. For an explicit and wider ranging discussion of the problem it is necessary to return to Baldwin (1966) who provides an extensive survey of the economic and social conditions of the Zambian population in the years before Independence. A more recent study was that by the International Labour Office (1977), which recognizes the nature of dualism in its title for the study, "Narrowing the gaps". Its coverage includes not only the question of income distribution and employment creation, but also such features as the existence of substantial variation between the rural and urban sectors (as well as within the urban sector) in terms of housing, water and sanitation, transport, education and training, health, and food nutrition. The basis of its prescription lies in the "basic needs approach" which has formed the basis of recent ILO policy recommendations in several countries (for example see ILO, 1976).

One of the results of the existence of a marked degree of dualism is the establishment of a pattern of migration from the rural to the urban areas, in spite of any inequalities which may be found within the urban areas. These latter attract large numbers of individuals, notably young males, from the rural areas, who migrate in the hope of finding paid employment, a hope which is frequently frustrated. This rural-urban migration has been very pronounced in Zambia: between 1963 and 1979 the population is estimated to have grown by about 62 per cent, while in the same period the urban population grew by 218 per cent and the rural population grew by only 21 per cent. The net result of this is that the proportion of the population living in urban areas increased from 20.5 per cent in 1963 to an estimated level of 40.4 per cent in 1979. The rapid growth of the urban population combined with the virtual stagnation of employment growth has the effect of increasing the level of urban employment, a rather more serious phenomenon than rural unemployment, because of the attendant problems of poverty arising from the inability to engage in any form of productive activity (such as subsistence farming), to provide even the bare necessities of life.

3.8 Conclusion

This chapter has surveyed the structural condition of the Zambian economy during the period 1965 to 1979. The picture which emerges is one of an extremely open economy, with an unusually high reliance on a fundamentally unstable sector, mining, which started from an atypically small base.

The openness is seen to have had a most serious effect on the economy, as the adverse movement in the terms of trade in 1974 and 1975 created a prolonged economic recession from which the economy had not begun to recover by the end of 1979 despite an apparently good balance of payments position in that year. In addition the economy developed proportionally larger expenditure on government final consumption and gross fixed capital formation than the average for other "middle income" developing countries, although the latter was qualified by an equally unusually high consumption of fixed capital.

The extent to which Zambia's performance and structure has departed from a stylized norm is demonstrated by Table 3.21. Although Zambia's per capita GNP is close to the median position, in no other respect can the Zambian economy be described as average. The annual growth rates of GDP (total and per capita), exports and gross investment were all very low relative to most other countries during the years from 1965 to 1973. Although exports and investment may not have grown very rapidly, both started from a substantial base and both accounted for larger than average proportions of GDP. The high proportionate share of investment would provide at least a partial explanation for the apparently paradoxical situation of a high incremental capital-output ratio co-existing with low investment growth rates. Similarly it helps to place in context Zambia's exceptionally high marginal and average savings ratios.

The combination of some of the highest degrees of export instability (14), commodity concentration (15), and adverse terms

Table 3.21 Comparative economic data: Zambia

Indicator	Number of countries	(Rank order) Zambia's position
1. Gross National Product per capita	145	79
2. Annual average growth rates (1965-73) of:		
Gross Domestic Product	141	130
Gross Domestic Product per capita	141	134
Exports	124	108
Gross domestic investment	129	122
3. Average incremental capital-output ratio (1968-73)	125	111
Average marginal national savings ratio (1968-73)	124	5
Average national savings ratio (1968-73)	124	6
4. Commodity concentration (1968-73)	113	107 (a)
Export instability (1968-73)	117	114 (b)
Terms of trade (1968-73)	117	91

Source: World Bank, World Tables 1976.

(a) Countries with lower ranking are: Nepal, British Solomon Islands, Oman, United Arab Emirates, Qatar, Libya.
(b) Countries with lower ranking are: South Vietnam, Cambodia, Yemen Arab Republic.

of trade movements provides some confirmation for the proposition that Zambia's unstable economic performance has, more than most, been a result of external factors. It should also be noted that these measures apply to the period before 1974, after which it is suggested, and will be established in Chapter 7, that the export instability has increased; while it has already been seen that the terms of trade deteriorated sharply and the extent of commodity concentration has not declined at all.

Instability has been found not merely in the performance of the economy, but in its very structure. It is clear that the problem may be traced to the continued importance of the mining sector. Chapter 5 will examine this sector more closely to identify its unstable features.

Notes

1. Unless otherwise stated all average growth rates are calculated as rates calculated from an exponential trend curve fitted to the time series. See Appendix III.3 for full details on this method.
2. The wholesale price index used is the index of all "domestically used goods", (including imports) with 1966 = 100. The index is not available before 1966 (source: CSO Lusaka, Monthly Digest of Statistics). The copper price is an index of the Kwacha equivalent of the London Metal Exchange cash settlement price for wirebars.
3. These net flows are made via the interconnected system operated for Zambia and Zimbabwe (formerly Southern Rhodesia) by the jointly owned Central African Power Corporation.
4. A correlation coefficient of $R = 0.7258$ was found between the terms of trade index and the current price share of net exports in GDP.

5. A linear trend line of

$$\begin{aligned} NE &= 16.73 - 1.17t & (R^2 &= 0.2028 \\ & & t_b &= -1.8187, \text{ significant only at} \\ & & & 10 \text{ per cent level}) \end{aligned}$$

and an exponential trend line of

$$\begin{aligned} NE &= 18.2e^{-0.072t} & (R^2 &= 0.0892 \\ & & t_b &= -1.1287 \text{ not significant at} \\ & & & \text{any conventionally accepted} \\ & & & \text{level}) \end{aligned}$$

were estimated.

6. As given by World Bank (1980): Iran, Iraq, Libya, Saudi Arabia, Kuwait.
7. Algeria: 48 per cent (oil exporter) and Argentina: 41 per cent.
8. Mauritania, Yemen (PDR), Congo, Papua New Guinea, Jordan, Argentina, Israel, Sweden.
9. The implicit deflator of imports of goods and services in GDP was used to bring 1965 and 1978 to 1970 prices.
10. "Domestic Factor Incomes" and "National Income" likewise declined as a proportion of GDP and for the same apparent reason.
11. Two major political speeches made by President Kaunda at Mulungushi and Matero where various plans relating to take-overs of industry were publicly announced. See Kaunda (1968 and 1969) and also Kaunda (1970) where further reforms were proposed.
12. See "South", February-March, 1981, pp. 67-8.
13. The Gini coefficient represents the area between the Lorenz curve and the line of perfect equality (the diagonal) expressed as a proportion of the total area beneath the latter. The Lorenz curve is obtained by plotting the cumulative proportion of total households/individuals, against the cumulative share of total income.
14. Measured in relation to deviations from a moving average trend.
15. Measured as the percentage contribution of the three principal commodities in total merchandise exports.

CHAPTER 4 THE MEASUREMENT OF INSTABILITY AND GROWTH
IN ECONOMIC TIME SERIES

4.1 Introduction

The concept of instability is widely used in economic discussions, particularly as regards the less developed countries (for example export earnings), yet any survey of pertinent literature will show that there is no single widely accepted method of measuring the extent of instability. This chapter reviews some of the more commonly used measures of instability, and will then suggest an alternative index which not only measures the extent of instability, but also takes into account the rate of growth of the variable. This latter feature is introduced because most indices of instability which are based on the elimination of trend do not distinguish between variations in the rates of growth of any two series which are being compared. Thus most indices would not show any difference between a series which fluctuated around a flat trend (i.e., one which shows zero growth) and another in which the variations were of equal size but in which the trend shows a high positive (or negative) rate of growth.

One of the reasons for studying instability must be a value judgement that instability is undesirable, and that policy measures are sought to reduce the amount of instability in the series in question. However it is necessary to go beyond this and to note that instability with contraction or stagnation should be regarded with greater concern than instability with growth, particularly in

the study of export earnings in the developing countries. With this in mind a composite growth and instability index was devised which is used in several parts of this study in parallel with a more conventional simple instability index.

Another basic problem must be mentioned, that is, whether a steadily increasing series may be regarded as perfectly stable, and it is suggested that there is no objective answer to this. It would generally be accepted that a constant steady increase in "real" or "volume" variables is desirable and, therefore, that the resultant series should be regarded as stable. On the other hand, if, for instance, an inflationary environment prevails with prices rising at a constant rate per annum, are we to regard this as stable, when in many economists' view an inflation is characteristic of an inherently unstable economy? The answer to this is not easily capable of resolution, and in this chapter indicators are sought in which the latter situation yields an index value equal to that given by a perfectly stable, zero-growth series. Thus it is necessary to find indicators which eliminate trend: for example moving averages, lines of best fit, etc.

The testing of the indices in this chapter is confined to instability in primary commodity prices, but the indices may equally be applied to other economic variables. In Chapters 5 and 7 the proposed composite index is used to analyze commodity prices and export earnings in greater detail.

4.2 A review of some existing indices

Several major studies have been conducted into the extent, causes and consequences of instability in primary producing countries, and many of these studies have developed their own indices of instability: for instance see United Nations (1952), Coppock (1962), Michaely (1962), MacBean (1966), Massel (1964 and 1970), O'Brien (1972), Knudsen and Parnes (1975), Sheehey (1977), McNicol (1978) and MacBean and Nguyem (1980). All of these studies develop or use some form of index of instability, most of them attempting to eliminate variations in time series due to trend. Some of the studies also develop composite indices which take such variables as export concentration (1) into account. However this latter type of index tends to become rather specialized and therefore to have applications only to one or a very few problems. Other indices, such as the transitory income index used by Knudsen and Parnes, are bound up with a particular economic hypothesis: in this case the permanent income hypothesis of Friedman (1957). In this review only those which attempt to remove trend are surveyed.

The United Nations (1952) used an index in which the absolute difference between successive observations are calculated and expressed as a percentage of the larger of the two annual values in question. These proportional differences were then averaged over the period in question; that is:

$$I_{un} = \frac{1}{n} \sum \left[\frac{X_{i+1} - X_i}{\text{Max}(X_i, X_{i+1})} \right]$$

This measure appears to have been adopted on the grounds of convenience rather than from any mathematical justification. An index of this form would be based more correctly upon the proportional rate of change from one year to the next, defined as the absolute difference between adjacent years expressed as a percentage of the earlier of the two years. Moreover, the index would not show any significant difference between a series which increased at a constant annual rate and one which rose and fell by equal percentages in alternate years.

A somewhat more satisfactory index was developed by Coppock (1962), and has been used in several subsequent studies (MacBean, 1966; Young, 1973; Erb and Schiavo-Campo, 1969; and others). It eliminates trend by calculating the logarithmic variance of the ratios between successive observations. The index is thus defined as follows:

$$I_{1v} = \text{antilog} \sqrt{V_{1\log}} \quad (4.2)$$

where

$$V_{1\log} = \frac{1}{n-1} \sum \left\{ \log \frac{X_{i+1}}{X_i} - m \right\}^2 \quad (4.2a)$$

$$m = \frac{1}{n-1} \sum \log \left\{ \frac{X_{i+1}}{X_i} \right\} \quad (4.2b)$$

and

n is the number of observations

and

X_i is the i th observation ($i = 1, \dots, n$)

One problem, pointed out by Sundrum (1967), and cited in Erb and Schiavo-Campo (1969), is that the above index I_{1V} , is dependent only on the initial and final values of the variable, X . Consider equation (4.2b) which may be rewritten:

$$m = \frac{1}{n-1} \sum (\log X_{i+1} - \log X_1)$$

and this reduces to

$$m = \frac{1}{n-1} (\log X_n - \log X_1) = \frac{1}{n-1} \log \frac{X_n}{X_1}$$

Thus the value of the mean (from which deviations are measured) is calculated from only two values. Various situations may be envisaged in which the initial and final observations are not representative of the general trend: for instance in a rising trend, where the initial value is at the peak of a cycle and the final value is at a trough, the value of m will be less than if the reverse position held. The problem is analogous to that raised by the use of the geometric mean as a measure of the average growth rate over a number of years. Again the average yielded depends on the two extreme observations, and takes no account of intermediate observations. (See Bell, Silver and Stray, 1981, for further discussion on the latter point).

Another widely used index measures deviations from a moving average trend; the World Bank's World Tables (1976) use a variation of this method, and an earlier application is found in MacBean's (1966) study. The index may be defined as:

$$I_{ma}(k) = \left\{ \frac{1}{n} \sum \frac{x_i - m_i}{m_i} \right\}^2 \quad 0.5 \quad (4.3)$$

where m_i is the k -point moving average centred on year i .

This has the advantage of being more correctly applicable to short periods, than, say, a trend line fitted by regression techniques, since in the latter case the goodness of fit may be seriously reduced by a small number of observations. However, in this very merit there lies a serious disadvantage for measuring instability in periods of a decade or less (using annual data): that the calculation of a k -point moving average removes $(k-1)/2$ observations from each of the beginning and end of the series in the calculation of the deviations, unless sufficient data is available outside the period in question to allow the coverage of all observations.

McNicol (1978) uses a rather simpler measure, the coefficient of variation, an index defined as:

$$I_{cv} = \frac{s}{\bar{x}} \quad (4.4)$$

where s is the standard deviation and \bar{x} is the mean.

The coefficient of variation does not eliminate trend; thus it merely measures the extent of variation of observations from the simple arithmetic mean expressed as a percentage of the latter. Thus I_{cv} would show perfect stability only where there is zero growth, and would show a series with a constant rate of growth as being unstable. I_{cv} measures absolute deviations from a constant, \bar{x} , as

opposed to deviations from the variable M_i in equation (4.3), and the deviation between actual and average ratios as in the logarithmic variance of index of equation (4.2).

Instead of adopting a measure which eliminates trend, McNicol's method is to measure the instability in series of the prices of various commodities deflated by an all-commodity price index. Thus instability is measured relative to a general index; this is a very specific application not appropriate in cases where such a general index does not exist. In particular, I_{CV} , could only be used for deflated or constant price series; and moreover, even a constant price series with a steady rate of growth would register a certain degree of instability. The only merit of the index I_{CV} is its relative ease of computation and interpretation, but these advantages are felt to be heavily outweighed by the drawbacks mentioned.

A method which has not been discussed thus far in this chapter is an index based on the deviations of actual observations from a trend line estimated by regression techniques. Thus we might define such an index, I_r , as:

$$I_r = \left\{ \frac{1}{n} \sum \left[\frac{x_i - \hat{x}_i}{\hat{x}_i} \right]^2 \right\}^{0.5}$$

where

x_i is the actual value of the i th observation,

and

\hat{x}_i is the "expected" value of the i th observation estimated from least square regressions.

The question arises as to which is the most appropriate mathematical form to use and one possible approach would be to find the curve of best fit in each case. However, this would make comparisons among several series impossible, if the same curve did not provide the best fit in each case. It would therefore seem more appropriate to select on a priori grounds one particular mathematical form and to use this in each case; this point will be considered in further detail shortly. The regression based method has the advantages that it takes account of all observations and deviations and moreover that it is based on mathematical forms which are amendable to further algebraic manipulation. It is noted that the indices at equations (4.3) and (4.5) represent the most commonly used variants of the general model used in the mathematical treatment by MacBean and Nguyem (1980) (2).

4.3 A growth and instability index

Any measure of instability makes some implicit assumption about the economic utility derived from a given trend. Thus an index such as I_{1V} (see equation 4.2) does not distinguish in any way among constant proportional decline, zero growth and constant proportional increase, since each of these implies that

$$\frac{X_{i+1}}{X_1} = \alpha$$

where α is a constant; and, since from (4.2b)

$$m = \log \alpha$$

then equation (4.2a) will show

$$V_{\log} = 0 \text{ (for any value of } \alpha \text{)}$$

This is of fundamental importance.

Consider a country dependent on the export of one primary commodity. It is clearly more desirable for that country that the price of the commodity should rise steadily than that it should remain constant (3), yet most indices would not distinguish between these situations, in terms of the ranking of instability. Almost as clearly it can be seen that the situation in which the price fluctuates about a rising trend is more desirable than a constant price, but in this case many indices would show the former situation to be less stable.

The point is perhaps clearer if considered in the context of total export earnings: a static level is less desirable than a situation where earnings follow an unstable but upward sloping growth rate, and more desirable than, say, an unstable but declining level of earnings.

It is therefore necessary to develop a measure which takes account, not only of the extent of instability, but also the rate (and direction) of growth of the variable during the time period in question. As stated it is assumed that a constant non-zero rate of change would represent stability as much as a series which shows no growth at all (4). It is suggested that an appropriate index would be provided by weighting one of the indices discussed in the previous

section by a measure of either the "average" or "total" growth during the period in question; and the following forms are suggested:

$$IG_a = \frac{1}{(1+r)} \cdot I \quad (4.6)$$

where IG_a is the instability and (average) growth index,

I is an instability index,

and r is the average rate of growth during the period in question (4).

$$IG_t = \frac{1}{(1+r)^{n-1}} \cdot I \quad (4.7)$$

where IG_t is the instability and (total) growth index,

I and r as above,

and n is the number of time periods.

The algebraic formulation of (4.6) and (4.7) was designed to decrease the numerical value of the instability index for positive growth, and to leave it unchanged for zero growth. The quantity $(1 + r)$ is the ratio between successive observations on a steady-state growth path, that is,

$$\frac{X_{i+1}}{X_i} = 1 + r \quad (4.8)$$

In addition to the above the instability index used should have the property in a situation of steady state growth that it yields a value corresponding to perfect stability. This criterion would be met by I_{1v} (equation 4.2) (6) and also I_r (equation 4.5) if an appropriate mathematical form is used (7) but not by $I_{ma}(k)$ or I_{cv} except in certain special cases (mainly zero growth). Finally, the

index chosen should be capable of yielding an appropriate average growth rate for substitution into (4.6) or (4.7). The index I_{IV} is at a disadvantage to I_r in that the former does not immediately suggest an appropriate rate, whereas average growth rates may be calculated from the expected values of the initial and final positions on the fitted curve from which I_r is calculated. Thus the estimated average growth rate, \hat{f} , would be:

$$\hat{f} = \left\{ \frac{\hat{x}}{x_1} \right\}^{1/n-1} - 1 \quad (4.9)$$

Based on the foregoing discussion it is suggested that the index I_r should be used, and that the familiar simple exponential curve meets all the criteria stated above; that is:

$$x_n = ae^{bn} \quad (4.10)$$

Then it may be shown that equation (4.9) yields:

$$\hat{f} = e^{\hat{b}} - 1 \quad (4.11)$$

Thus we may denote the basic instability index as I_{re} based on equation (5) and using the exponential form of equation (4.10). Then the alternative forms of the composite instability and growth index, equations (4.6) and (4.7) become:

$$IG_{ae} = \frac{1}{1+\hat{f}} \cdot I_{re} \quad (4.12)$$

$$IG_{te} = \frac{1}{(1+\hat{f})^{n-1}} \cdot I_{re} \quad (4.13)$$

Two potential drawbacks are noted:

- (a) both constant negative and constant positive growth rates will show composite index values of zero and further refinement is needed to overcome the problem;
- (b) the growth and instability components are not of equal significance insofar as a stable trend (zero instability) will yield an index value of zero while a "flat" trend (zero growth) will not yield an index value of zero. Thus the "composite" index remains essentially an index of instability weighted by the associated growth rate.

4.4 An application of the composite indices

Potential applications of these indices abound in many branches of economics. The initial empirical testing of the indices is confined to commodity price data. This is appropriate because these price series have followed a wide range of time paths, thus providing a number of contrasting cases to test the indices.

Price indices relating to the nominal and deflated prices of thirty-one primary commodities significant in international trade (8) for the period 1960 to 1979 formed the basis of the tests. Price indices (in nominal terms) were taken from the International Monetary Fund's International Statistics Yearbook 1980, and the deflated series were obtained by using that publication's index of world export unit values (9).

The following instability indices were tested:

- (a) the logarithmic variance index, I_{cv} (equation 4.2);

- (b) the moving average trend index for 3-point and 5-point moving averages, that is, $I_{ma} (3)$ and $I_{ma} (5)$ - (equation 4.3);
- (c) the coefficient of variation, I_{cv} - (equation 4.4);
- (d) the exponential trend index, I_{re} (equation 4.5);
- (e) the composite indices based respectively on average and total growth IG_{ae} and IG_{te} (equations 4.12 and 4.13).

Before discussing the empirical results it should be stressed that the numerical values relating to each of the indices have significance only relative to other data series measured by the same index; that is the absolute values obtained from any one index, say I_{1v} can only be directly compared to other commodities measured by I_{1v} . The index values obtained for, say tin from I_{1v} and I_{cv} cannot be compared directly although the relative position of tin in a list ranked on the basis of the two indices can be meaningfully discussed.

Table 1.4 in Chapter 1 contains price data expressed in current and deflated terms respectively for eight selected commodities, some of which display marked instability as measured by various of the indices. These eight commodities were chosen also because they figure particularly prominently in international trade and reveal considerable variation among commodities. Preliminary inspection of these series revealed very different time paths: for instance, tin, coffee and petroleum increased in "real" terms during the period 1960 to 1979, while copper, sugar and rubber have followed a rather more volatile (and decreasing) path.

The comparison of the indices was conducted by obtaining a rank ordering of each index and the computation of the coefficient of rank correlation between pairs of indices. In addition the product moment coefficients of correlation were calculated between all pairs of indices. Comparisons were made in respect of both current and deflated price series, and for the years 1960 and 1979 as well as for the two shorter periods 1960 to 1969 and 1970 to 1979. Only a selection of the results is presented here, but these are felt to be representative of the full set of results on which the conclusions are based. In Table 4.1 is presented the rank ordering of the price instability of the 31 commodities during the period 1960 to 1979, using the deflated price series. It is immediately noted that the index IG_{te} yields considerable variations in the ranking of several commodities when contrasted with the other six measures; this is so in the case of such commodities as jute, tea, rubber, hides, bananas, cocoa and petroleum. This impression is confirmed by reference to Table 4.2 which is a classification of the rank correlation coefficient between all pairs of indices expressed both in current and deflated prices for the full period 1960 to 1979. It is noted that the relatively small number of "good" correlations show a large variation in the rank order obtained by using different indices. Thus one conclusion of this study is that the choice of index is of considerable significance in measuring instability, thus contradicting the conclusion of MacBaeon (1966). A further relative conclusion drawn from Table 4.2 is that the indices I_{re} and IG_{ae} appear marginally to produce the most consistent measures as

Table 4.1 Rank order of price instability of 31 commodities as measured by seven indices of instability: deflated by world export unit values, 1960 to 1979

Commodity	IGte	Ire	IGae	I _{ma} (3)	I _{ma} (5)	I _{lv}	I _{cv}	IGte current
Copper	1	4	3	12	15	12	5	10
Sisal	2	2	2	7	5	5	4	2
Sugar	3	1	1	1	1	1	1	4
Jute	4	17	16	19	25	19	8	8
Tea	5	23	22	23	21	25	12	3
Wool	6	15	14	10	10	14	16	5
Rubber	7	20	20	15	17	18	9	1
Rice	8	9	8	16	9	10	15	9
Groundnut cake	9	13	11	5	7	9	18	14
Copra	10	12	10	2	2	2	19	7
Soybean meal	11	8	9	4	6	7	14	17
Fishmeal	12	7	7	3	3	3	10	18
Zinc	13	5	5	13	12	11	6	13
Beef	14	6	6	11	13	8	7	22
Wheat	15	16	17	24	20	22	22	11
Hides	16	11	12	6	4	4	17	15
Soybeans	17	19	19	18	18	20	23	23
Bananas	18	28	28	29	29	28	20	19
Maize	19	24	24	28	27	26	27	16
Palm oil	20	21	21	14	14	17	24	12
Iron ore	21	32	32	27	30	30	13	6
Lead	22	18	18	20	16	16	21	25
Aluminium	23	29	29	32	32	32	28	20
Coffee	24	14	15	9	11	13	11	26
Cotton	25	27	27	21	22	12	30	24
Groundnut oil	26	22	23	22	23	21	26	21
Nickel	27	25	25	31	31	31	29	32
Cocoa	28	10	13	8	8	6	3	29
Tin	29	26	26	25	24	24	25	28
All commodities	30	31	31	30	26	29	32	27
Lamb	31	30	30	26	28	27	31	30
Petroleum	32	3	4	17	19	15	2	31

Table 4.2 Classification of rank correlation between each index of instability and all others: 1960 to 1979 (a)

(Numbers in each category)

	Current prices			Deflated prices		
	Good	Moderate	Poor	Good	Moderate	Poor
Exponential	3	2	1	4	1	1
Exponential and average growth	3	2	1	4	1	1
Exponential and total growth	-	-	6	-	-	6
3-point moving average	3	3	3	4	1	1
5-point moving average	4	-	2	4	-	2
Logarithmic variance	4	1	1	4	1	1
Coefficient of variation	-	3	3	-	5	1

(a) Range for each category: "Good" 0.8 to 1.0
 "Moderate" 0.6 to 0.8
 "Poor" less than 0.6

indicated by the slightly larger number of "good" and "moderate" coefficients of correlation, while the very high correlation which exists between these two suggests little advantage in adopting the "average" growth composite index IG_{ae} in preference to I_{re} .

Further evidence of these conclusions is provided by Table 4.3, showing the product moment coefficients of correlation. In general the patterns shown by the two measures of correlation (rank and product moment) were very similar.

The most striking feature of Table 4.2 and 4.3 is the uniformly "poor" correlation with other indices shown by the growth and instability index, IG_{te} . Thus the introduction of total growth during a period alters most substantially the index value and a commodity's ranked position, a point confirmed by the change in the ranked position of such commodities as petroleum, rubber, jute, tea and tobacco. Of the other indices the weakest performance is shown by the coefficient of variation, I_{cv} , but as noted earlier one reason for this in the case of the current price series is that this index does not yield a value of zero for constant non-zero growth. Although both IG_{te} and I_{cv} show low correlations with other indices, the correlation between the two is the lowest of any. Given the limited a priori grounds for adopting the index I_{cv} it is given no further attention.

The index I_{re} correlates well with most other indices; moreover, the index is based on the conventionally accepted notion of deviation

Table 4.3 Coefficients of correlation between indices of instability: nominal and relative prices: 1960 to 1979

	I _{re}	IG _{ae}	IG _{te}	I _{ma} (3)	I _{ma} (5)	I _{lv}	I _{cv}
Deflated prices							
I _{re}	1.0000						
IG _{ae}	0.9989	1.0000					
IG _{te}	0.6017	0.6365	1.0000				
I _{ma} (3)	0.8066	0.8116	0.5526	1.0000			
I _{ma} (5)	0.8305	0.8357	0.5421	0.9727	1.0000		
I _{lv}	0.8960	0.8984	0.5602	0.9661	0.9735	1.0000	
I _{cv}	0.8227	0.8113	0.4721	0.6151	0.5970	0.6887	1.0000
Current prices							
I _{re}	1.0000						
IG _{ae}	0.9984	1.0000					
IG _{te}	0.4096	0.4555	1.0000				
I _{ma} (3)	0.7919	0.8003	0.3975	1.0000			
I _{ma} (5)	0.8184	0.8286	0.4104	0.9776	1.0000		
I _{lv}	0.8878	0.8941	0.4124	0.9703	0.9782	1.0000	
I _{cv}	0.7393	0.7068	0.2260	0.5299	0.5463	0.6110	1.0000

from an estimated trend. For these reasons this index is used in Table 4.4 to provide a contrast with the composite growth and instability index in a consideration of the relative instability of the 31 commodities.

The behaviour of the "all commodities" price index displayed in Table 4.4 indicates two general points concerning commodity prices during the period 1960 to 1979. Firstly, there was an increase in the overall level of instability between the two periods 1960 to 1969 and 1970 to 1979, with both indices registering approximately a threefold increase. The second point is that, since the value of IG_{te} is lower than that of I_{re} in both periods, but particularly from 1970 onwards it is apparent that there was a deterioration in the international purchasing power of primary commodities taken as a group, and that this suggests that the net terms of trade of many primary producing countries declined. The behaviour of the all commodities index is further illustrated in Table 4.5 which compares index values resulting from both current and deflated price series. A value of IG_{te} higher than I_{re} is indicative of a negative rate of growth; the converse also applies. Thus, as would be expected with general inflation, the use of current price series results in low values of the index IG_{te} ; and a problem of interpretation arises in that it is not clear whether instability is occurring in the context of a secular rise or decline. It is therefore suggested that the use of the index IG_{te} would be of greatest value when applied to appropriately deflated price series, and particularly if a comparison is to be made with more conventional measures.

Table 4.4 Indices of instability of commodity prices relative to world export unit values (a)

	IG _{te}			I _{re}		
	1960 to 1969	1970 to 1979	1960 to 1979	1960 to 1969	1970 to 1979	1960 to 1979
Copper	7.3	47.4	55.5	17.0	18.5	35.6
Sisal	45.1	42.3	52.2	23.9	48.4	40.1
Sugar	118.3	106.5	51.6	62.7	67.5	75.3
Jute	19.5	20.4	47.1	19.6	8.8	19.6
Tea	8.1	24.3	37.4	5.4	18.8	14.9
Wool	20.6	29.6	37.4	12.8	28.2	21.9
Rubber	19.7	15.9	35.5	11.3	15.7	16.2
Rice	6.5	45.4	34.9	9.2	34.8	27.8
Groundnut cake	4.7	49.2	33.1	4.9	30.8	25.5
Copra	8.3	38.7	33.0	9.1	35.1	25.5
Soybean meal	3.6	51.1	31.6	4.0	34.2	28.0
Fishmeal	12.6	52.9	30.8	14.4	35.3	31.0
Zinc	12.0	57.6	28.7	14.6	38.0	33.1
Beef	9.6	60.7	28.1	13.3	29.2	32.7
Wheat	6.0	34.5	25.8	5.5	25.8	19.7
Hides	18.8	26.4	22.1	16.1	31.6	25.6
Soybeans	7.5	30.3	20.9	7.4	22.5	18.9
Bananas	6.6	14.2	20.4	6.7	10.0	11.1
Maize	6.1	24.9	19.9	5.8	15.5	14.3
Palm oil	15.2	21.4	19.8	11.2	17.9	15.9
Iron ore	7.2	13.2	19.6	4.5	7.0	7.2
Lead	12.2	18.6	16.6	17.6	19.4	19.6
Aluminium	2.2	16.5	15.5	2.2	13.7	10.8
Coffee	8.2	18.6	15.0	9.0	28.8	23.0
Cotton	3.9	19.9	14.5	3.6	16.2	12.5
Groundnut oil	9.2	19.6	13.8	8.0	16.1	15.2
Nickel	5.1	11.4	12.9	6.0	7.4	13.9
Cocoa	14.2	9.7	12.6	19.2	23.3	25.8
Tin	10.6	7.3	10.6	13.1	10.7	13.8
All commodities	3.4	12.1	9.5	3.3	10.4	8.1
Lamb	6.5	12.4	9.4	7.1	11.6	10.1
Petroleum	1.7	6.1	8.7	1.3	30.5	35.9

(a) Ranked on the values of IG_{te} in the period 1960-79.

Table 4.5 Instability indices for "all commodities":
nominal and relative prices

	<u>Current price series</u>		<u>Deflated price series</u>	
	<u>IG_{te}</u>	<u>I_{re}</u>	<u>IG_{te}</u>	<u>I_{re}</u>
1960-69	3.3	3.6	3.4	3.3
1970-79	5.2	14.6	12.1	10.4
1960-79	5.5	17.6	9.5	8.1

Further evidence of the behaviour of the composite growth and instability index arises from the consideration of individual commodities. As might be expected crude petroleum provides a most interesting illustration of the behaviour of the indices. The oil price revolution which started in 1973 resulted in a very large price increase reflected in all the indices, except IG_{te} , as a high degree of instability: so that most indices showed petroleum to be one of the most highly unstable of the 31 commodities (see Table 4.1), with the index I_{re} indicating that petroleum was the third most unstable commodity in the period 1960 to 1979. In contrast the ranking yielded by IG_{te} shows petroleum to be the most "stable" of the 31 commodities, and although there is an increase in the value of the index from 1.7 to 6.1 between 1960 to 1969 and 1970 to 1979, the increase is very much smaller than the change in the value of I_{re} from 1.3 to 30.5. Similar behaviour is demonstrated by two other commodities, cocoa and coffee, both of which recorded relatively high rates of growth during the 1970s. Lower but still positive rates of growth were recorded by such commodities as beef, hides, tin and zinc, and in such cases the perceived level of instability was reduced by the use of IG_{te} (see Table 4.4).

The majority of the commodities surveyed (18 out of a total of 31) recorded negative trend growth rates over the entire period 1960 to 1979, and a somewhat larger number, 23, in the more recent period 1970 to 1979. Among these commodities, which consequently yielded high values of the index IG_{te} , were copper, tea, jute and rubber, all of which showed substantial changes in their ranked position relative

to other commodities. The metal, copper, provides a useful example of a commodity which underwent a significant change between the two periods. From 1960 to 1969 its price rose significantly in "real" terms in such a way that the values of I_{re} and IG_{te} were 17.0 and 7.3 respectively and the ranked position of copper relative to the other commodities showed it to be respectively sixth and nineteenth most unstable in the first period. Thus according to the index I_{re} which takes no account of the direction of change, copper registered a high degree of instability largely because of an upward movement of its real price. In the subsequent ten-year period 1970 to 1979, the real price of copper fell sharply, as did its nominal price, and the values recorded by the two indices showed the converse pattern: that is, the value of IG_{te} at 47.4 was very much higher than the value of 18.5 shown by I_{re} , and copper proved to be the most unstable commodity over the whole twenty-year period.

These selected examples show that large differences are introduced to the measurement of instability if growth is considered in addition to deviation from a trend. However, it must be stressed again that these results are produced by the use of the "total" growth and instability index; there is no noticeable variation from the simple index based upon the exponential trend when only an average growth rate is introduced.

4.5 Conclusion

The measurement of economic instability requires a clear statement of what is regarded as being "perfectly stable", and it is

suggested that many users of instability indices are not aware of the importance of the assumptions implicit in the indices which they are using. Abstracting temporarily from the treatment of trend or average growth rates, the normative judgement adopted in this paper has been that a satisfactory index of instability should not distinguish between zero growth and steady state growth. This preliminary criterion would preclude the use of the coefficient of variation or indices based on deviations from a simple moving average trend.

A more serious problem, particularly in the study of the prices of, and exports derived from, primary commodities is that most indices ignore the direction and rate of change of the time series in question. Thus two series might show equal instability, yet one could be rising through time and the other could be decreasing. A composite index has been proposed which takes both instability and total growth during the period into consideration, the instability being measured as the deviations from an exponential curve fitted to the series, and the growth rate being estimated from the slope of the fitted curve (see equation 4.13). The effect of the index is to decrease the value of an equivalent simple instability index if growth is positive and vice versa. Very substantial variations in the rank ordering of a number of commodities were achieved by the application of this composite index.

Further study would be required to overcome a basic limitation: that the growth and instability components are not of equal significance. Thus a stable trend (zero instability) would register an

index value of zero, whilst a "flat" trend (zero growth) will not yield a zero value. The composite index remains essentially an instability index weighted by the associated growth rate.

The empirical testing of the index and its relationship to other more commonly used indices has been performed on the prices of primary commodities and further elaboration is made in Chapter 5. A more frequent use of this type of index relates to the export earnings of the primary producing countries, an area considered in Chapter 7, where the composite index is used to reappraise some earlier findings of the association between export instability and economic performance.

Notes

1. Export concentration may be taken to be the extent to which the composition of a country's exports differs from the global composition. An example among the cited studies is MacBean and Nguyem (1980) who draw together the concepts of instability and concentration although the index used is not strictly a composite one.
2. The study considers the relationship between export instability and commodity concentration. Their instability index is defined as the variance of u_t , where u_t is the percentage deviation export earnings from any appropriate trend, that is

$$u_t = \frac{X_t - \hat{X}_t}{\hat{X}_t}$$

It is assumed that u_t is distributed normally, that is $N(0, S^2)$ and the variance of u_t , S_t^2 is defined as:

$$S_t^2 = \text{Var}(u_t^2) = E(u_t^2)$$

3. This assumes that the price elasticity of demand is less than unity, that is, price rises leading to a smaller proportional decline in demand and hence to an increase in export earnings.

In the short term at least, this is felt to be a reasonable assumption for most commodities.

4. It was not possible to distinguish between constant negative and constant positive growth. Thus each would appear to be equally stable, a possible defect of the proposed index which requires further study.
5. As will be seen in the next section, the use of IG_a did not materially affect the ranking obtained by the use of the simple index, I .

6. $\frac{X_i + 1}{X_i} = 1 + r$ for all $i = 1, \dots, (n-1)$

Thus from (2b)

$$m = \log \frac{X_1 + 1}{X_1} = \log (1 + r)$$

and since

$$V_{\log} = \frac{1}{n-1} \sum \log \left\{ \frac{X_i + 1}{X_i} - m \right\}^2$$

Then $V_{\log} = 0$ and $I_{1v} = 1$ (perfect stability). (2a)

7. If the form $x_t = ae^{bt}$ is used then it follows that $x_i = \hat{x}_i$ (for all $i = 1, \dots, n$) yielding a value of $I_r = 0$ (perfect stability).
8. In addition an all-commodities index computed by the IMF is also used.
9. The inflation procedure follows that used by McNicol (1978), who used the index I_{cv} .

CHAPTER 5 COPPER IN THE WORLD ECONOMY: PRODUCTION, TRADE AND PRICES

5.1 Introduction

In order more fully to understand instability in the Zambian economy it is necessary to appreciate the extent and causes of the instability which affects the international copper industry, and it is this, together with certain aspects of the mineral producing sector of the Zambian economy, which forms the substance of this chapter. However no attempt is made to present a comprehensive review of the international copper industry, since two recent studies have provided perspectives on the subject which are in effect complementary. Mikesell (1979) provides a comprehensive overview of copper production, consumption, international trade, pricing systems and trends, costs of production, investment patterns, and other issues relating to nationalization, exploration and an examination of the long-term prospects for global copper exploitation. He concludes that substantial new investment will be necessary globally, and finds that about half of this will be needed in the LDCs merely to maintain their share of output. In a more radically critical study Mezger (1980) examines the structure of the international copper industry exploring national and international power distribution and related influences on the copper producing and exporting countries, concluding that the international economic order may lead copper producing nations towards de-industrialization and de-nationalization. Both these studies will be cited at various stages of this discussion. Historical analysis of the prices and

costs in the copper industry was provided by Herfindahl (1959), and a more general descriptive review of the copper industry has been undertaken by Prain (1975), and its contribution on the ownership structure and development costs of new capacity is noted.

This chapter will review the structure of the international copper economy, with reference to production, consumption and international trade, and will discuss the way in which the price of copper is generally determined. The behaviour of copper prices will be discussed, over various time periods and comparisons will be made between copper and other primary commodities. In particular an examination will be undertaken of the extent to which copper is more or less stable than other commodities. It is found that copper fared rather better than most in the 1960s, but rather worse than others in the 1970s in terms of both instability and the loss of international purchasing power.

Background information on the processes involved in the mining and refining of copper appears in Appendix V.1, which also summarizes the main forms in which copper occurs naturally, and at the other end of the production cycle the main types of copper product and the sources of demand for these products.

5.2 Primary commodities and copper in international trade

The extent to which many less developed countries are dependent upon the export of primary commodities has been discussed previously (1), and it was seen that Zambia and some leading oil producers

relied for over 90 per cent of their export earnings on one primary commodity. A further aspect of this characteristic of developing countries is illustrated by Table 5.1, which shows two features of the international trade of primary commodities and in some cases (e.g., tin and copper) related semi-fabricated products. Firstly, it is noted that the developing countries represent a major source of supply for many important commodities, such as petroleum (crude), sugar, tin, tea, coffee, cocoa and natural rubber, of whose production over 60 per cent is produced by developing countries. The table shows only those commodities which are significant in terms of total world trade as measured by value. There are many other commodities which are of crucial importance to the manufacturing economies of the industrialized nations which form an almost negligible proportion of total world trade, but which are produced largely in the developing countries (2). Copper contrasts quite strongly with this general characteristic: although a large proportion of total export refined copper products (including semi-fabricated products) originate from developing countries, this proportion was considerably less than half the total in 1975. This latter feature is tentatively proposed as one reason why the copper exporters "cartel", CIPEC (3), has failed to exercise effective control over the international price of copper, that is it controls only a minority of world trade in refined and semi-fabricated products; indeed CIPEC does not include all developing producing nations among its members. By contrast over four-fifths of tin exports of a similar level of manufacture originate in the developing countries. These issues will be examined later in this chapter.

Table 5.1 Structure of international trade in leading commodity exports of developing countries, 1975

SITC Code (a)		Percentage of commodity in the total trade of			Percentage of trade attributed to	
		World	Developed countries	Developing countries	Developed countries	Developing countries
682	Copper	0.70	0.61	1.10	56.6	37.3
281	Iron ore	0.61	0.43	1.09	45.2	42.1
687	Tin	0.10	0.03	0.36	17.7	82.2
283	Non-ferrous metal ores	0.67	0.54	1.18	52.6	41.7
263	Cotton	0.51	0.21	1.12	26.7	52.9
231	Rubber (including synthetic)	0.40	0.22	1.03	36.1	61.3
072	Cocoa	0.26	0.07	0.91	17.0	83.0
071	Coffee	0.51	0.07	1.95	8.7	91.3
074	Tea	0.11	0.02	0.39	12.1	86.1
044	Maize	0.77	1.00	0.47	84.5	14.6
042	Rice	0.23	0.20	0.42	56.6	43.4
221	Oil seed	0.59	0.64	0.71	71.0	28.5
	Vegetable oils	0.22	0.08	0.70	23.4	76.5
011	Meat	0.78	1.06	0.27	88.3	8.2
061	Sugar	1.33	0.49	4.18	23.9	74.8
331	Crude petroleum	12.76	0.67	49.36	3.4	92.0
332	Petroleum products	3.92	2.43	7.99	40.4	48.5
	Total (17) primary commodities	<u>24.47</u>	<u>8.77</u>	<u>73.23</u>	...	...
719	Non-electric machinery	4.62	6.33	0.26	89.1	1.3
724	Telecommunications equipment	1.49	2.06	0.37	90.1	5.9
729	Electrical machinery	1.70	2.31	0.50	88.3	7.0
732	Motor vehicles	6.53	9.39	0.45	93.7	1.6
841	Clothing	1.64	1.53	2.10	60.5	30.4

Source: United Nations Conference on Trade and Development, *Handbook of International Trade and Development Statistics, 1979* (Table 4.4).

(a) The SITC 3-digit code is used throughout. This does not allow a detailed analysis of the exact form of the trade: thus "copper" includes blister + refined but unfabricated metal (typically produced by developing countries) as well as alloys and semi-fabricated products like bars, rods, wire tubes and pipes largely produced by industrial countries.

Secondly, in contrast to the significance of primary commodity trade to individual developing countries as well as the proportion of total primary commodity trade coming from these countries, only a small proportion of all international trade comes from the export of these commodities. About one quarter of world trade is represented by the seventeen primary commodities shown in Table 5.1, which reduces to less than 8 per cent if crude and refined petroleum is excluded. These same commodities account for almost three-quarters of the total exports of the developing countries and less than 9 per cent of developed countries exports, while many of the commodities taken individually represent very small proportions of total world trade. In this regard copper is seen to be of considerable importance, since in 1975 it was the most important non-food, non-fuel commodity, accounting for about 0.7 per cent of total world trade in that year; but the large proportion of this produced and exported by the developed nations in the form of semi-fabricated goods is again stressed.

The five categories of commodities shown at the bottom of Table 5.1 provide a markedly different pattern to that discussed above. They are all products of manufacturing industry, and it should be noted that they are far more heterogeneous in composition than the primary commodities. These commodities account for large part of the exports of the developed countries (21.6 per cent for these five SITC groups alone) and a very small proportion indeed of the exports of developing countries (3.7 per cent), with corresponding figures for the proportion of world trade originating in the

two groups of countries - about 90 per cent of exports coming from the developed countries. The only exception is the case of manufactured clothing where about 30 per cent of world exports originate in developing countries, a result of the relatively low technology needed to produce these goods and the availability of the necessary raw materials.

Copper is very important in international trade for both developed and developing countries, and it is no exception in that a significant proportion of total world exports (of the primary commodity excluding processing beyond the refined but unfabricated metal) comes from the latter group. A more detailed description of international patterns of production, consumption and international trade of copper is taken up in section 5.3.

5.3 The structure of the international copper industry

Copper is unusual among primary commodities in that the minor part of total output originates in the less developed primary producing countries, but the major part of international trade copper comes from LDCs. For instance, nearly half of mine output is produced in the LDCs, but only about one-fifth of total refined copper output is produced in these countries. In contrast to this fairly low proportion of total output, the LDCs account for over 70 per cent of total world exports of all forms of copper. To explain and elaborate this pattern a classification is presented which identifies four major types (with some sub-categories) of countries according to production or consumption of copper. This

classification represents a series of "stylized facts" about the countries identified. It is summarized in Table 5.2.

The various presentations in Appendix S, Table S.3.1 and Tables 5.3A and 5.3B, which show world production, consumption and international trade in terms of both volume and the proportionate structure, all based upon information relating to 1979. These tables deal with production and trade of copper ore, blister and the refined metal only; that is excluding the production of processed goods. The classification presented is based upon the various patterns emerging from the three tables. The output of the three stages of production - mine, smelter and refined - may be taken to correspond to the trade categories - ores, blister and refined (4).

The classification proposed is as follows:

(1) Non-consuming exporters - those countries which produce large amounts of copper, but whose consumption is negligible. There are the "primary producing" countries; but it is necessary to distinguish three types among these:

(a) Exporters of ore - countries which have a substantial mine output, but which have not developed any smelting or mining capacity; examples of this group would be Papua Guinea and the Philippines.

(b) Exporters of blister - countries which are able to extract, process and smelt a major part of their mine output, but which have not invested in the necessary plant to produce the final refinery product (wirebars, etc.).

Table 5.2 An international classification of copper industry
by status of production and export with examples

	Consumers	Non-consumers
<u>Exporters</u>	1. Canada, Australia	Producers of:
		2.1 Ore - Papua New Guinea
		2.2 Blister - Zaire
		2.3 Refined metal - Chile, Peru, Zambia
<u>Non-exporters</u>	3.1 Self-sufficient: USA, China	4. Most less developed countries
	3.2 Importers of:	
	3.2.1 Ore - Japan	
	3.2.2 Refined - Most OECD countries	

Table 5.3A Copper: Proportionate structure of world production, consumption and trade, 1979
(Percentages of world total of each classification)

	Mine (a)		Production		Consump- tion	Exports		Imports			
	Smelter (b)	Refined (b)	(Scrap)	Refined (d)		Ores (d)	Blister (d)	Refined	Ores (d)	Blister (d)	Refined
1. Primary producing countries (c)											
Peru	5.0	4.5	2.5	--	0.2	2.6	18.4	--	--	--	--
Chile	13.4	11.6	8.3	--	0.5	8.2	21.6	--	--	--	--
Zaire	5.0	4.5	1.1	--	--	2.5	35.2	--	--	--	--
Zambia	7.4	7.3	6.0	--	--	--	2.8	--	--	--	--
Philippines	3.7	--	--	--	--	24.3	--	--	--	--	--
Papua New Guinea	2.2	--	--	--	--	14.3	--	--	--	--	--
South Africa	2.6	2.2	1.6	--	0.7	1.8	4.2	--	--	--	--
Total	39.3	32.5	19.6	--	1.5	53.7	82.2	--	--	--	--
Total primary producing countries	46.7	35.8	24.6	9.4	9.5	66.9	92.3	63.4	5.2	--	10.5
2. Industrialized											
USA	18.2	17.1	21.2	38.4	22.1	3.7	1.0	2.7	22.9	12.1	7.2
Canada	8.1	4.7	4.2	0.9	2.5	26.5	--	6.8	--	--	1.1
Japan	0.7	11.3	10.5	16.6	13.6	--	--	1.7	73.3	15.8	10.3
Western Europe	3.3	8.5	14.7	34.7	28.9	2.9	6.7	20.5	19.4	72.1	67.4
Total	30.4	41.6	50.6	90.6	67.1	33.1	7.7	31.6	94.8	100.0	86.0
Total (1 + 2)	77.1	77.4	75.2	100.0	76.6	100.0	100.0	95.0	100.0	100.0	96.4
3. Centrally planned economies	22.9	22.6	24.8	...	23.4	...	...	5.0	...	...	3.6
World total	100.0	100.0	100.0	...	100.0	...	...	100.0	...	...	100.0

Source: Appendix S, Table S.3.1.

- (a) Recoverable copper content.
- (b) Includes scrap recovery.
- (c) Includes Australia.
- (d) Data for centrally planned economies is not available so figures given are percentages of total non-CPEs.

Table 5.3B Copper: Proportionate structure of exports by country of origin, 1979

	Percentage of country total				Percentage of world total of refined copper exports (a)
	Ores	Blister	Refined	Total	
A. Exports					
1. Primary producing countries					
Peru	8.2	36.3	55.5	100.0	8.3
Chile	9.8	16.3	73.9	100.0	21.7
Zaire	8.1	72.8	19.1	100.0	7.9
Zambia	--	3.2	96.8	100.0	14.0
Philippines	100.0	--	--	100.0	6.3
Papua New Guinea	100.0	--	--	100.0	3.7
South Africa	15.9	23.0	61.0	100.0	3.0
Total	<u>21.5</u>	<u>20.7</u>	<u>57.8</u>	<u>100.0</u>	<u>64.8</u>
All primary producing countries	<u>24.5</u>	<u>21.3</u>	<u>54.3</u>	<u>100.0</u>	<u>70.9</u>
2. Industrialized capitalist economies					
USA	35.1	5.8	59.0	100.0	2.7
Canada	62.5	--	37.5	100.0	11.0
Japan	--	--	100.0	100.0	1.0
Western Europe	5.3	7.7	87.0	100.0	14.3
Total	<u>29.6</u>	<u>4.3</u>	<u>66.1</u>	<u>100.0</u>	<u>29.0</u>
Total (1 + 2)	<u>26.0</u>	<u>16.3</u>	<u>57.7</u>	<u>100.0</u>	<u>100.0</u>
B. Imports					
Primary producing countries	15.3	--	84.5	100.0	8.1
USA	7.5	22.2	70.3	100.0	6.8
Canada	--	--	100.0	100.0	0.7
Japan	67.0	7.4	25.6	100.0	26.4
Western Europe	8.1	15.4	76.5	100.0	57.9
Industrial capitalist countries	24.9	13.5	61.6	100.0	91.9
Total	<u>24.1</u>	<u>12.4</u>	<u>63.5</u>	<u>100.0</u>	<u>100.0</u>

Source: Appendix S, Table S.3.1.

(a) Excludes centrally planned economies.

Thus the larger part of these countries' exports would take the form of blister; the chief example of this would be Zaire, of whose exports about three-quarters are of this form.

(c) Exporters of refined metal - those producers which have developed the capacity to process the major part of their mine output to the stage of the refined metal. Each of Peru, Chile and Zambia would have to be included in this group, although Zambia was by far the most advanced in this regard, as Table 5.3B shows. Zambia was unusual among these countries in developing a much larger refining capacity than the other producers in the early years of its Independence during the 1960s. It is only during the 1970s that the South American producers have increased their refinery capacity.

(2) Consuming exporters - there are industrialized countries which also have sufficient reserves and production capacity to allow them to become net exporters of refined copper. Principal among these countries is Canada, but the classification could also include Australia.

(3) Self-sufficient consumers - those countries which consume substantial amounts of copper, but are able to meet most of their requirements from domestic mining and refining activity. The main example of this type is the United States whose total net importation in 1979 was only about 8 per cent of total consumption.

(4) Importing consumers - among which two main types may be distinguished:

(a) Ore importers - these would be industrial countries which are substantial customers but instead of importing the refined product, prefer to create the value added in the processes of smelting and refining domestically. The only internationally significant importer of this type is Japan, which imported about 60 per cent of its final consumption requirements in the form of ore, and less than a quarter in the form of the refined metal.

(b) Importers of refined metal - countries with little or no reserves of copper, which have only limited refining capacity (and for whom refining might not be a viable proposition) and which import the major part of their consumption needs in the refined form. Most of the Western European industrialized countries fall in this category, and Table 5.3B shows that over three-quarters of their total imports are of refined copper.

Table 5.4 provides further evidence of the substantial differences among the major groups of countries identified above. In the case of non-consuming exporters it is to be expected that refined production will be less than 100 per cent of mine output, the actual level being determined by the extent to which these producing countries have developed their refining capacity. Thus it is noted that of the four major non-consuming exporting countries, Zambia, Chile and Peru have all increased the proportion of their mine output which

Table 5.4 Refined copper production as a percentage of mine output: top ten ore producers (a)

	1965	1970	1975	1979
1. USA	159.6	130.4	125.6	137.5
2. USSR	116.8	116.2	129.1	131.6
3. Zambia	75.1	84.9	92.9	97.0
4. Chile	49.3	67.2	64.6	73.5
5. Canada	85.1	80.7	72.1	61.7
6. Zaire	52.9	39.4	45.6	25.8
7. Peru	22.8	16.9	37.8	57.7
8. Japan	341.5	590.7	963.4	163.9
9. Australia	103.0	92.2	87.7	74.7
10. China	133.3	108.3	160.0	167.7

Source: Appendix S, Table S.3.2.

(a) Based on rank order of ore production in 1965.

is refined, while Zaire appears to have regressed in this regard (5). Two of the "consuming exporters", Australia and Canada, have made very large increases in the level of mine production without expanding refinery capacity at the same rate; consequently their exports of ore (and blister) have increased to countries such as Japan. With respect to the remaining countries it may be found that copper production exceeds mine output for three reasons: that a large amount of ore or blister is imported (as in Japan and Western Europe); that a large proportion of refinery output is of secondary copper, that is from scrap recovery (as in the United States where, in 1979, about 43 per cent of final consumption demand was covered by scrap recovery); or that a certain amount of refined production is met by the decumulation of ore or blister stockpiles.

The corporate structure of the international mining industry shows considerable variation among the major groups of countries described above. Thus as Waite (1975) has noted, the industry in the United States is marked by vertical integration through the industry, with a small number of companies involved in mining, smelting, refining and fabricating accounting for about three-quarters of total US production. This relatively oligopolistic structure provides a partial explanation for the system of producer pricing which exists only in the United States (see section 5.4). Elsewhere integration is not so evident. In the non-consuming exporting countries production from mine to refinery tends to fall under single companies, particularly in those countries where partial or complete nationalization has occurred; for instance Roan Consolidated Mines and Nchanga

Consolidated Copper Mines in Zambia (now combined in Zambia Consolidated Copper Mines) and Gecamines in Zaire. In Japan a fairly clear distinction exists between importers (of ore), smelters, refiners and fabricators, and the importation of ore which is the characteristic of the Japanese copper industry was developed with a minimum of direct equity participation, although development finance may have been provided to new mining projects in the producer countries. In Western Europe smelting and refining companies purchase ore and blister from foreign independent suppliers, and sell the refined product in competition with overseas suppliers to the semi-fabricators with contracts related to the prices of the London Metal Exchange.

Waite suggests that there is a trend away from vertical integration even in the United States, where the increasing need for imported ore means that the traditional pattern within that country of the siting of mines, smelters and refineries in single locations may be breaking down. The converse of this trend is that large and probably independent smelters will develop thus interposing a significant intermediate stage in the transformation of copper from ore to refined metal. It is probable that most of the non-consuming exporters will endeavour to increase the value added created within their own borders, although as noted in Appendix V.1 the advent of continuous cast rod (CCR) means that the refining stage must occur close to the point of consumption. This will mean that the less developed countries will have to establish continuous rod casting plants in the developed countries, as Zambia as done in France (see Appendix V.1), or will have to establish "downstream" operations,

i.e., semi-fabrication and fabrication. However the problem with this last option is that the developing country would run up against tariff barriers in the importing countries. Tariffs are usually zero for unprocessed refined copper, but the USA, Japan and Western European nations impose tariffs of between 5 and 22 per cent on semi-fabricated products (Mikesell (1979, p. 74)).

In summary, certain important features of the world copper industry are mentioned which are important in determining the arrangements for the international trade and marketing of copper to be discussed in section 5.4. These are: the dependence of the European consumers on imported refined copper, with the consequent need for an efficient and favourable (to the importer) system of commodity exchanges; the desire of Japan to develop domestic refining industry; the ability of the United States to satisfy most of its consumption requirements from domestic mining and refining activity; and the important though not dominant position of the primary producing countries as the source of most internationally traded copper. Finally it is noted that although the centrally planned economies are large producers and consumers of copper (both mined and refined), if they are treated as a whole, then like the United States, they are self sufficient and do not represent a significant part of international trade in copper.

Both Mikesell and Mezger provide rather more detailed surveys of the structural characteristics of the international copper economy, the former with particular reference to the United States'

industry, and the latter providing rather more detail in terms of the European industry (6).

5.4 International systems for pricing copper

There are essentially two ways in which copper prices are fixed (see McNicol (1975)): firstly, there are the "free market" prices which are established daily on the major metal exchanges, of which the most important in terms of overall world trade is the London Metals Exchange (LME) followed by the New York Commodity Exchange (COMEX). The second important system based on "producer prices", which are charged to the purchasers of refined copper by copper refineries in a number of industrial countries. The latter relate almost exclusively to domestic transactions, the former to internationally traded copper. Thus for a producer price to exist, it is virtually a necessary condition that a substantial amount of copper should be refined within the country of final consumption. Thus producer pricing systems do not exist in the non-consuming exporters (the less developed countries) where there is no domestic demand for refined copper, nor in industrial countries such as the United Kingdom which has only a very small domestic refining capacity. Producer pricing systems exist in countries such as West Germany, Japan and Australia, but even in these cases there is some form of direct or indirect linkage with LME prices. The best established system of producer pricing exist within the United States for reasons which have already been alluded to in the previous section: the virtual self-sufficiency of the US in terms of copper demand and supply.

5.4.1 Producer prices. The system can perhaps be best illustrated by reference only to the United States, if only because of the size of its domestic market. The producer price is used principally by the Canadian and US producers of primary refined copper, i.e., that produced directly from ore, while the secondary (scrap recovery) producers tend to use "outside markets" or metal exchange prices. This secondary production accounts for about 40 per cent of total US consumption so the producer pricing system is significant but by no means dominant even in North America. Most primary transactions in the US take place on the basis of annual contracts which commit both producer and consumer to deliver or purchase given amounts of copper, subject to the usual force majeure provisions. These contracts do not, however commit the parties to a particular price and the price charged on final delivery will be the current producer price of the individual supplier. However, consumers of copper in USA do not face a cartel since they are able to buy from secondary producers or on Comex, or even if circumstances demand it, from overseas suppliers, probably at prices determined by prevailing LME prices. For this reason US producer prices are unlikely to vary substantially from the "free market" prices of the metal exchanges in the long term, since if the former consistently exceeded market prices then the US consumers would try to purchase on world markets, with the dual consequence that world prices might be pushed upwards, while US producers would be forced to lower their prices in order to preserve their market. The main difference may occur in the short term where producer prices are likely to show less variability,

since transactors are "locked in" by the system of annual contracts. In recent years producer prices have become rather more responsive to prices in world markets and some US producers have tied their prices to daily quotes from Comex.

5.4.2 Metal exchange prices. The London Metal Exchange (LME) is by far the most important exchange as far as the determination of international trading prices of copper is concerned. Only a very small proportion of copper is actually traded on the LME; according to Rudolf Wolff (1980) between 200,000 and 300,000 tons of copper are absorbed into or supplied from the warehouses of the LME each year, with perhaps two or three times that volume being handled by the merchant members of the exchange. Even allowing that this could produce trade of up to one million tonnes annually, this still forms only about 10 per cent of total world consumption in 1979. The LME's key role is that it is the market of last resort: that is, when transactors are unable to buy or sell sufficient quantities under contractual or other arrangements, then they will resort to direct trading on the LME. Consequently, a marginal variation in the balance between demand and supply in the total world market, will be far from marginal in terms of the volume of trading on the LME; thus for instance if there is an excess supply of 2 per cent globally, then this amount would equal 20 per cent of total trading on the exchange (assuming that 10 per cent of all trade passes through the LME) and would obviously have a very marked impact on prices. This marginal nature of many commodity exchanges may well be a reason for the instability of commodity prices.

In spite of the fairly small volume of trading which takes place on the LME, the daily official price announced at the end of each morning's trading is most significant since it forms the basis for most transactions concluded on that day regardless of whether the LME is used in any way. Most internationally traded copper is the subject of annual contracts between producer and consumer, in which quantities are fixed, but the price is normally agreed to be the settlement price prevailing on the LME at the time of delivery (7)(8). More detailed accounts of the way in which trading is conducted and prices are fixed may be found in Gibson-Jarvie (1979), and in Rudolf Wolff (1980).

The LME is atypical among commodity exchanges in certain important respects. Firstly, trading of all forms takes place in the same location, that is, physical trading, forward transactions and futures trading are all conducted within the one exchange. Thus the LME tends to be used by transactors to meet requirements for physical transactions to a far greatest extent than is the case with the soft commodities (cocoa, coffee, etc.) where the futures markets are used rather more extensively for the purpose of hedging by producers and consumers. Thus Gibson-Jarvie notes that about 12 to 15 per cent of LME transactions run to maturity, as opposed to being closed out in the process of speculative dealing: this is clearly felt to be an exceptionally high level of non-speculative activity but it does give an indication of the relative level of speculation in the commodity futures markets. The LME futures contract is for a maximum of three months, much shorter than that for many "softs" (e.g., rubber futures run up to 24 months).

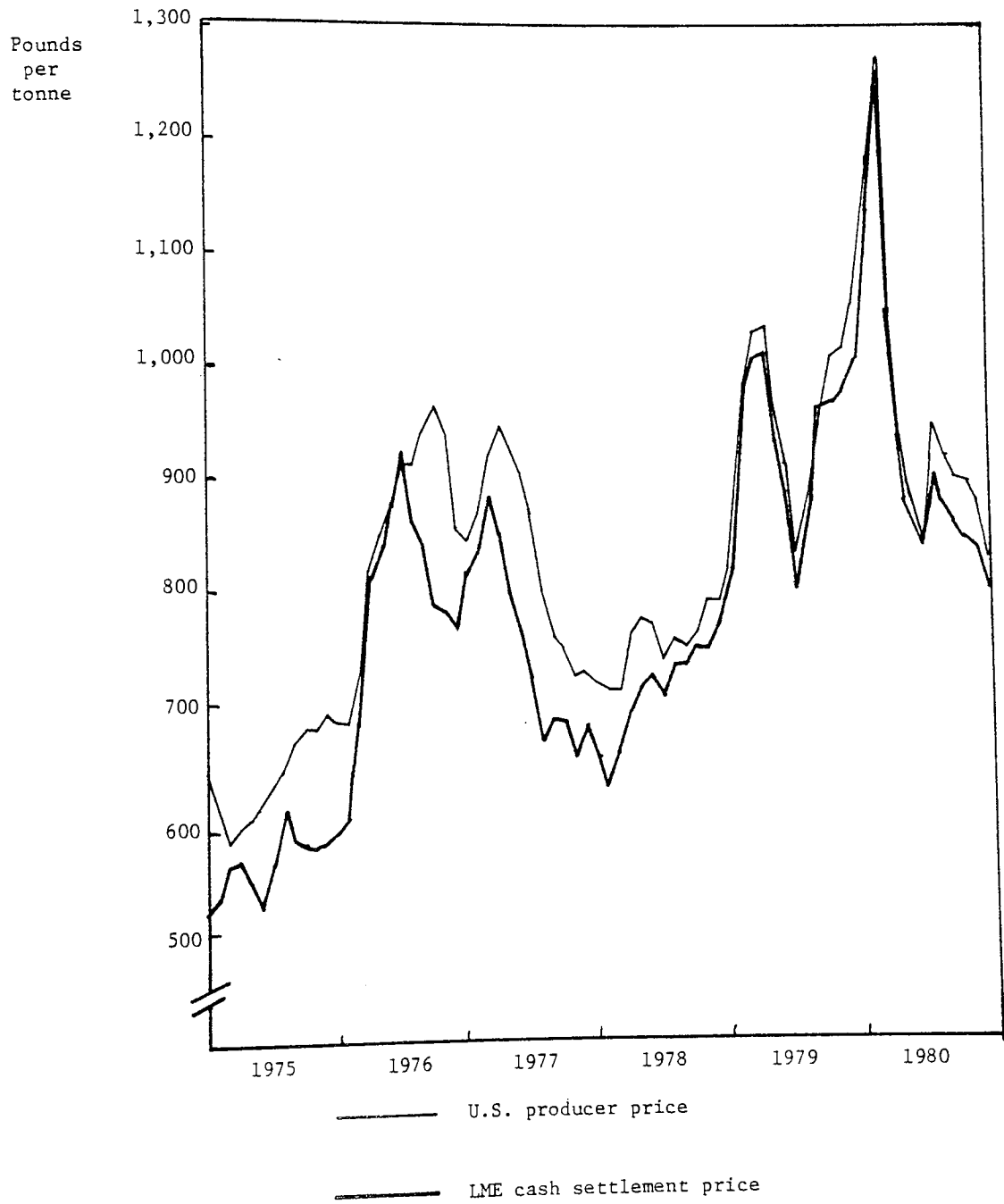
A second difference between the LME and other futures markets is that membership is personal (as opposed to institutional), small (there is provision for a maximum of 36 members), and all trading is on a principal's contract basis. In most commodity exchanges, although deals are struck between individuals the contracts are concluded using the services of a clearing house (9), which acts as the principal buying from the seller and selling to the buyer the amount involved in the agreed transaction. In the LME there is no independent clearing house system, and therefore all contracts are concluded between principals. All these features of the LME would appear to create an institution which is somewhat exclusive in its operations. Foreign membership of the LME is now quite accepted, but a detailed examination of the companies represented by the current trading members of the Exchange, and the ultimate ownership of these companies, shows that although the large mining companies of the industrial countries are well represented on the LME, none of the less developed producing nations (of any metal) is represented in any way (10). This may be partly due to the fact that the producers in the industrial countries show a considerable degree of horizontal integration, mining and producing a variety of metals, while the producers in the less developed countries tend to concentrate on the production of one main mineral. Thus the limited number of membership places would be likely to militate against the election to membership of a company representative with only limited interest outside his main sphere of activity. The lack of producer country representation on the LME may be one reason why the LDCs tend to

treat the commodity exchanges with suspicion and do not use them for purposes such as hedging.

5.4.3 Relationship between pricing systems. Prices on the LME and Comex tend to move in parallel, due to the existence of arbitrage facilities. Arbitrage becomes attractive when prices in two future markets differ by more than the cost of transporting the physical goods from one to the other. If, for instance, prices on Comex were higher than on the LME then investors would find it attractive to sell forward on Comex covering their position by buying simultaneously an equivalent contract on the LME. The ability to undertake this transaction with almost complete certainty of making a profit means that any difference which opens between the two markets will very quickly be narrowed.

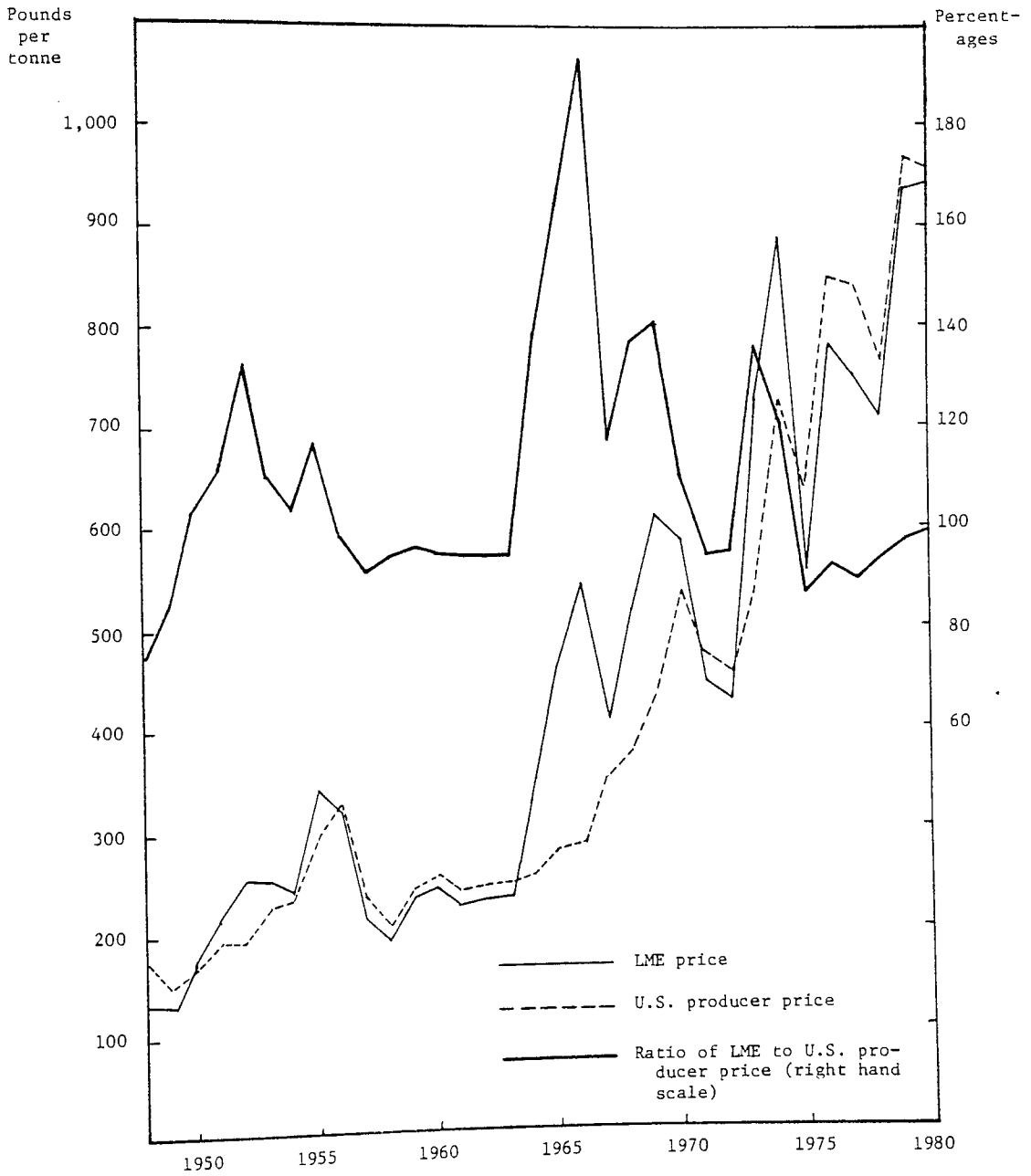
The relationship between producer prices on the one hand and metal exchange prices on the other is rather more complex and requires slightly more discussion. Figure 5.1 shows that the US producer price has been very highly responsive to variations in the LME price in the period from 1975 to 1980, particularly in the years from 1976 onwards, and there is also the suggestion of a lag of about one month in the movement of the producer price in response to changes in the LME price. However the evidence of Figure 5.2 suggests that the close correlation between the two series has not been so pronounced in a longer term perspective; a statement which is also true of the apparent tendency for LME prices to be no greater than the US producer price. Thus, in the period 1950-56, the LME

Figure 5.1 U.S. producer prices and LME prices of copper:
monthly averages, 1975-80



Source: Appendix S, Table S.3.3.

Figure 5.2 LME and U.S. producer prices annual averages, 1948-80



Source: Appendix S, Tables S.3.3 (prices) and S.6.4 (exchange rate).

price was the higher, probably due to the fact that the US government had imposed price controls in association with the Korean war, and a relatively large gap between the two opened up particularly in 1952 and 1955. In subsequent years up to 1963 the two prices moved very much in phase, indeed this was a period of marked price stability. However in the years from 1964 to 1970, a large differential was established with the LME price at one stage (in 1966) nearly double that charged by the US producers, who chose to increase their prices slowly and infrequently. It would appear that the LME price shows greater volatility. It is the higher of the two in strong markets - hence the higher prices of the 1960s - but falls below the producer price in weaker market situations, such as occurred in the years after 1974. That the LME price should be the more unstable of the two might be expected a priori, since a free market price is more likely to vary than one which is the subject of either a semi-formal cartel arrangement or governmental control. The greater instability of the LME price is formally confirmed by the instability indices of Table 5.5 which shows values for the LME price almost double those of the US price (11).

The graph in Figure 5.2 of the ratio of LME prices to US producer prices yields the somewhat unexpected conclusion that, although the former may have been the lower in slightly more years (18 as opposed to 15), the largest differentials occur when the LME price is higher. Part of the explanation must lie in the cost of transportation of copper from the London markets to North America

Table 5.5 Indices of instability: US producer prices relative to LME prices, 1950-79

	1950-59	1960-69	1970-79
US producer prices (£/lb)			
I (a)	0.1694	0.0601	0.1107
IG (b)	0.1212	0.0406	0.0735
US producer prices (£/tonne)			
I (a)	0.1694	0.1062	0.1117
IG (b)	0.1212	0.0617	0.0549
LME prices (£/tonne)			
I (a)	0.2066	0.1571	0.1900
IG (b)	0.1850	0.0532	0.1098

Source: Calculated from Appendix S, Table S.3.3.

(a) Simple instability index based on deviations from exponential trend.

(b) Composite growth and instability index: index I "weighted" by a measure of the total growth of the index in the period in question. See Chapter 4 for full explanation.

but this is an inadequate answer. The more fundamental question must be answered as to why it is that the US producers should be prepared to maintain for prolonged periods, such as from 1963 to 1970, prices which were far below those available on the free market. Under rational economic behaviour it would surely be expected that producers would either follow market prices or attempt to establish a price in excess of the (LME) free market level, rather than effectively subsidizing certain users of copper products, and in consequence having to impose some form of rationing as has been done from time to time in North America.

Mikesell (1979) considers this question in some detail (12). He notes that almost one half of the output of the primary copper producers in the United States is supplied to fabricators that form part of the integrated copper conglomerates, and that copper is supplied on the understanding that it should not be re-sold on the open market. He discusses two explanations that are commonly put forward: firstly that higher prices may lead to substitution of other products for copper; and secondly that price volatility may lead to instability in the industry, by causing the development of excessive or inadequate production capacity relative to the long term trend of demand. However as Mikesell (1979) and Rudolf Wolff (1980) note there is only limited potential for substitution between copper and other products in the short- to medium-term because of development and retooling costs. With respect to the need to provide some stability in the market for copper, Mikesell argues that if a large portion of the US copper production is the object of rationing

or price control, then this will tend to promote instability in the rest of the market, since marginal variations in supply or demand will represent a substantial part of the volume of trading on the free market, a point already developed in the previous section. Finally, Mikesell cites a study by McNicol in which the latter suggests that a policy of rationing by the copper producers is rational if they discriminate in favour of industries in which long run substitution is most probable, since this will secure the long run demand of these industries (McNicol, 1975).

Whatever the reasons for the behaviour of US producer prices with respect to those on the LME it points to the difficulties of imposing some form of effective price stabilization on a global scale.

5.5 Instability of copper prices

5.5.1 The measurement of instability. A survey of methods for measuring instability was conducted in Chapter 4, and a composite growth and instability index was proposed which assigns a higher value to series whose trend growth rate is low or declining than to those with a more rapid rate of increase. In order to allow comparison with more conventional methods this study uses two indices: one is a simple instability index based on deviations from an exponential trend, and the composite index which weights the simple index by the inverse of the estimated total growth (in proportional terms) over the entire period covered by the series (13). The former, the simple instability index, is defined as:

$$I = \left\{ \frac{1}{n} \sum \left(\frac{x_i - \hat{x}_i}{\hat{x}_i} \right)^2 \right\}^{1/2} \quad (5.1)$$

where x_i is the i th observation and \hat{x}_i is the exponential curve estimate of that observation ($i = 1, \dots, n$).

The composite growth and instability index, IG, is defined as

$$IG = \frac{1}{(1+\hat{r})^{n-1}} \cdot I \quad (5.2)$$

where \hat{r} is the trend growth rate estimated from the exponential trend curve fitted to the n observations (14).

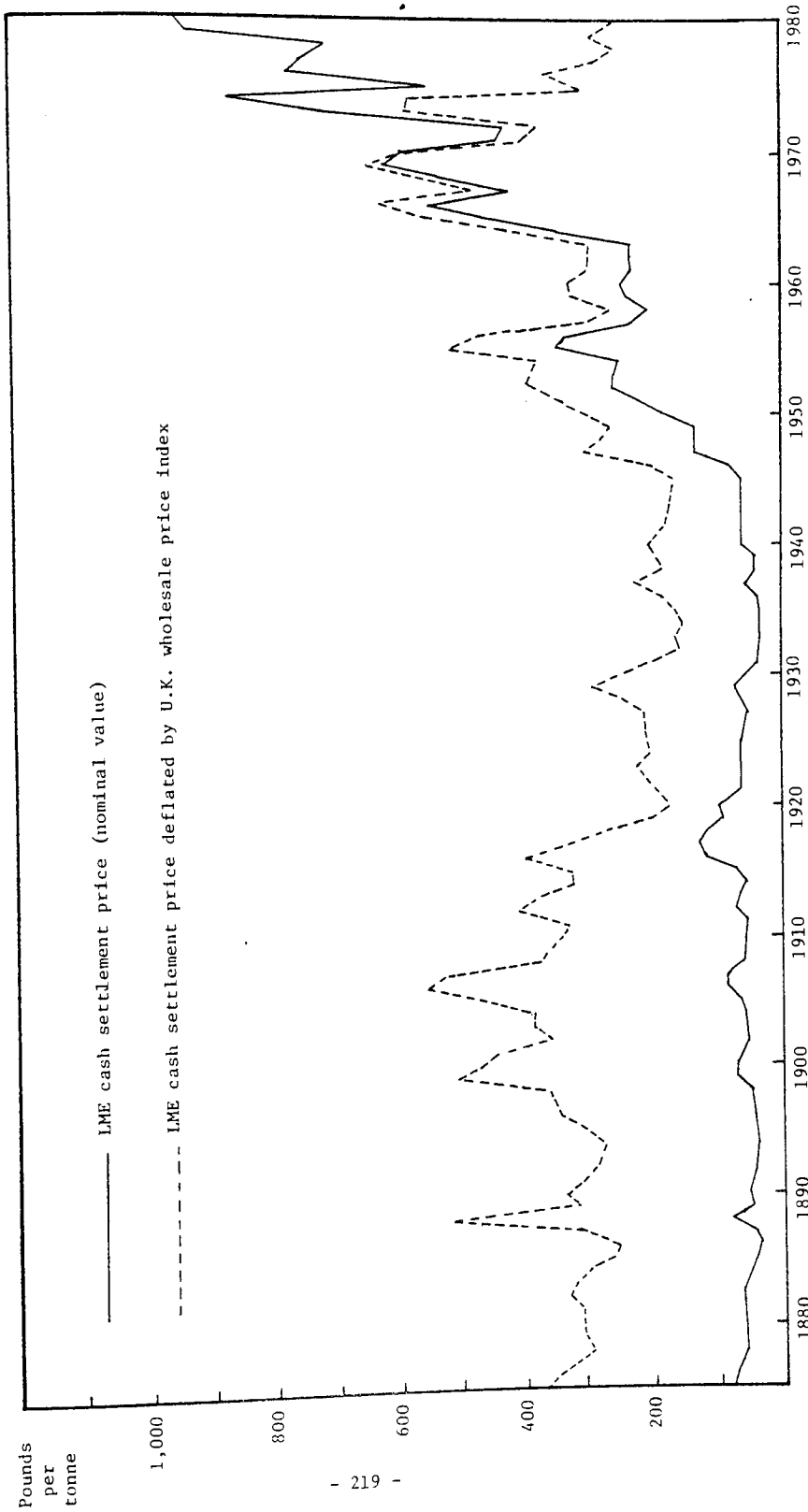
The indices cannot be analyzed simply in terms of the absolute values which they produce; they must be interpreted by comparison with other relevant variables, e.g., with the same series over a different time period to determine whether the degree of instability has changed, or with other countries or commodities to see which is the most unstable, etc.

5.5.2 Copper prices, 1875-1980. Prices on the London Metal Exchange are well documented, and a complete series is readily available, and is reproduced in Appendix S, Table 5.3.4, together with a series of deflated prices (15), used to attempt to assess the international purchasing power (or commodity terms of trade) of copper over as long a period as possible, and to detect any cyclical or other secular pattern in the international price for copper. The use of the LME price throughout the period is justified, because since its establishment in 1875 the LME has been the focus of attention in international trade in copper, lead and zinc, and the price quoted on the exchange must be regarded as the most representative of international prices.

Both series (current and constant prices) are represented in Figure 5.3, which also shows the annual ranges of prices (expressed in current values) from 1935, and the ten yearly ranges in the preceding period centred on the middle year of the decade in question. Figure 5.4 presents the current price series on a semi-logarithmic scale, in order to give a more accurate impression of the relative instability over the entire period (16). The behaviour of copper prices during the period is now discussed in terms of trend, cyclical patterns and instability.

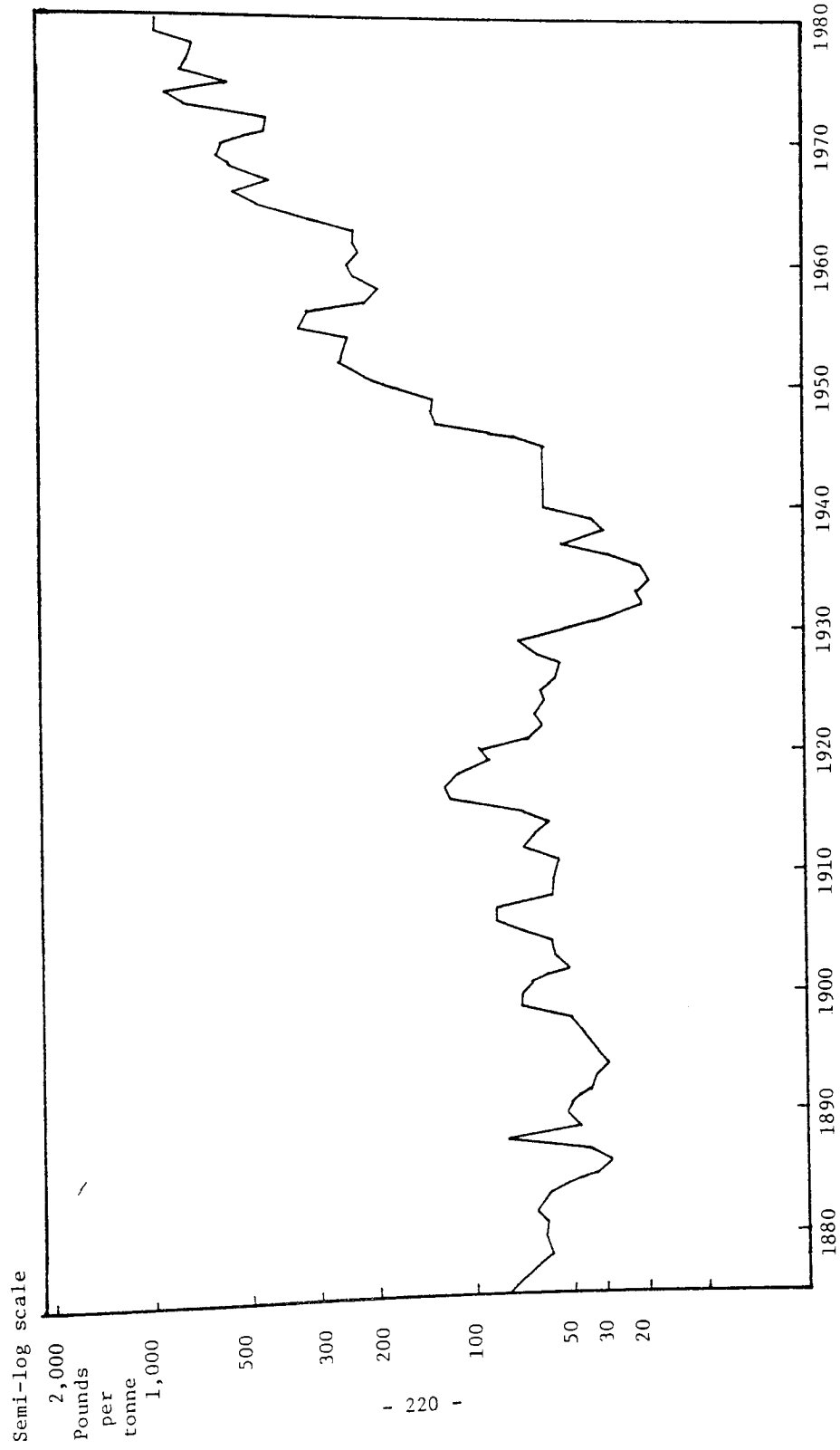
Firstly, the trend of the series of current prices is clearly upward sloping reflecting general world inflation, and any further comment is unnecessary except to note the large annual variation about the trend line. Of rather greater interest is the behaviour of the series of constant prices (the dotted line in Figure 5.3) since this allows a comparison to be made across time periods of the price of copper relative to world prices. The results of least squares regressions using both linear and exponential models are presented in Table 5.6, and confirm the impression conveyed by Figure 5.3 that there is no discernible trend. Indeed the coefficients of correlation were not significantly different from zero for either model, of the two periods (1875 to 1980 and 1950 to 1980) which were used. Thus any simple statistical analysis of the time series in the long term is unlikely to yield any results of significance; it is suggested that some form of econometric modelling might yield more positive results. What is clear from Figure 5.3 is that copper prices expressed in real terms during the period 1965-74 were

Figure 5.3 LME copper prices (nominal and deflated values), 1875-1980



Source: Appendix S, Table S.3.4.

Figure 5.4 LME copper prices, 1875-1980



Source: Appendix S, Table S.3.4.

Table 5.6 Trend of relative copper prices (a): 1875 to 1980

	Regression coefficients		
	α	β	R^2
<u>Linear</u>			
1875-1980	326.6	0.3903	0.0107
1950-1980	391.6	0.7839	0.0033
<u>Exponential</u>			
1875-1980	301.0	0.0004	0.0012
1950-1980	385.1	0.0002	0.0004

Source: Calculated from Appendix S, Table S.3.4.

(a) LME price deflated by index of UK wholesale prices (see Footnote 15 to Chapter 5.)

at historically high levels, but that the fall of prices from the peak in 1974 was of unprecedented magnitude in the years since 1875. Moreover, although prices in 1975 fell very sharply from the previous year's level and apparently recovered thereafter in nominal terms, when measured at constant values it is found that prices in the years 1977-80 were lower still. These two observations are of considerable importance to the discussion of the Zambian economy which, it has already been noted in Chapters 2 and 3, was found to be under little or no financial constraint during the 1960s, but increasingly during the 1970s was constrained by scarce financial resources.

Secondly, both Figures 5.3 and 5.4 suggest a fairly strong cyclical pattern to the movement of copper prices, but there appears to be little evidence of regularity to this pattern. In order to explain the cyclical behaviour of copper prices it is necessary once again to look beyond simple techniques of time series analysis to the more comprehensive econometric analyses such as those of Fisher, Cootner and Baily (1975), Charles River Associates (1970) and Arthur D. Little (1978) all of which are cited in Mikesell (1979). Each of these models examines a range of factors which influence the level and behaviour of copper prices, such as aggregate supply and demand analysis, and more disaggregated models which take account of conditions in individual producing and consuming countries. If a cyclical pattern could be detected before 1974 then the events of the second half of the 1970s have almost certainly led to the disruption of this pattern, as is suggested by both figures 5.3 and 5.4.

Thirdly, the evidence of Table 5.7 suggests that the degree of instability of copper prices has increased considerably during the 1970s, particularly if the composite index IG is considered with respect to the constant value series. The whole period was divided into decades, and the degree of instability of both current and constant value series was measured using the two indices, I and IG, discussed in section 5.5.1. As might be expected there is considerable variation in the index values among the time periods. The effect of the composite index is well demonstrated by the contrasting periods 1961-70 and 1971-80 using the constant value series. In the former case the use of IG causes a substantial reduction from the value of I, indicating that the series was growing in real terms, while in the latter instance the index value of IG is increased markedly reflecting the decline in the real value of copper prices during the 1970s. As a matter of incidental interest it is noted that the only other period in which there was an effect similar to that of the 1970s was in the years 1911-20, when in the aftermath of the First World War, general price levels rose very sharply but the price of copper fell, possibly due to a decline in demand from the armaments industries which are heavy users of the metal. The fact remains that whichever of the two indices is taken the greatest instability in copper prices occurred in the years from 1971 to 1980. This conclusion holds true only for the constant price series: an intertemporal comparison using the nominal values because of the differential rates of inflation in the various periods.

Table 5.7 Intertemporal comparisons of instability
in copper prices: 1881-1980

(Percentages)

	<u>Current values</u>		<u>Constant values</u>		Trend growth rates (c)
	I (a)	IG (b)	I (a)	IG (b)	
1881-1890	21.7	24.8	20.3	17.8	1.5
1891-1900	14.7	9.5	11.0	6.5	6.1
1901-1910	18.0	17.1	17.5	18.7	-0.7
1911-1920	19.2	10.1	17.9	35.0	-7.2
1921-1930	9.5	10.2	8.0	6.0	3.3
1931-1940	17.4	10.6	10.1	8.6	1.7
1941-1950	16.4	5.2	13.2	7.3	7.4
1951-1960	18.0	19.4	18.8	23.5	-2.5
1961-1970	15.9	5.3	16.2	7.0	9.7
1971-1980	18.8	9.7	22.4	43.2	-7.0

Source: Calculated from Appendix S, Table S.3.4.

- (a) Instability index.
- (b) Instability and growth index (see Chapter 4).
- (c) Exponential trend growth rate.

It has been seen that there is no discernible overall time trend in the series of copper prices; however the final column of Table 5.7 shows that the average rate of decline during the 1970s was the most pronounced of any period with the exception of 1911-20 which was only marginally higher. Moreover it has been noted that after a prolonged period of abnormally high prices up to 1974, a sharp decline occurred in which prices fell to exceptionally low levels, in the latter part of the 1970s, during which previously observed cyclical patterns appear to have disappeared. Perhaps most seriously, the copper price was found to be more unstable (especially when measured using the composite growth and instability index) than at any time since trading commenced on the London Metal Exchange. Thus in terms of intertemporal comparisons copper is found to have become more unstable in recent years. In the context of global economic recession it is apposite to enquire whether copper has been exceptional in this deterioration and to assess its performance relative to other commodities.

5.5.3 Instability in commodity prices, 1950-80. Tables 5.8 and 5.9 represent the application of the indices I and IG to copper and thirty other commodities over two ten-year periods 1960-69 and 1970-79, and to the full twenty years. The second of these periods includes the commodity price "boom" of 1973 and 1974, and might therefore be expected to exhibit the greater instability; and this is confirmed by the "all commodities" index in Table 5.8. This table also shows clearly the impact of the IG index in some cases, for instance petroleum, the price of which rose sharply several times

Table 5.8 Indices of commodity price instability: nominal values, 1960-79 (a)

(Percentages)

	1960-69		1970-79		1960-79	
	I (b)	IG (c)	I (b)	IG (c)	I (b)	IG (c)
<u>Metals</u>						
Aluminium	23.9 (2)	2.1	10.5	3.9	17.0	6.5
Copper	17.5 (7)	6.8 (8)	22.1 (20)	17.4 (5)	24.2 (20)	10.1 (10)
Iron ore	4.9	6.6	11.4	6.7	16.8	12.2 (6)
Lead	17.8 (6)	11.1	21.2	6.2	25.3	5.8
Nickel	5.8	4.4	6.8	3.2	11.3	2.8
Tin	12.9	9.4	13.7	2.9	24.9	5.1
Zinc	14.6 (8)	10.8 (10)	46.9 (2)	21.8 (2)	36.9 (5)	8.5
<u>Industrial "softs"</u>						
Copra	9.2	7.6	43.5 (5)	14.8 (8)	33.2 (6)	11.5 (7)
Cotton	3.1	3.1	17.4	6.5	18.9	5.9
Hides	16.6	17.4 (6)	26.0	6.7	32.0	7.4
Jute	20.0 (4)	17.9 (5)	8.2	5.8	16.4	10.5 (8)
Rubber	11.6	18.3 (4)	17.6	5.5	31.0	18.2 (1)
Sisal	23.6 (3)	40.3 (2)	60.8 (2)	16.3 (6)	51.6 (3)	18.0 (2)
Wool	13.0	18.8 (3)	26.8	8.6	28.3 (9)	12.9 (5)
<u>Beverages</u>						
Cocoa	19.3 (5)	12.9 (8)	22.9	2.9	37.5 (4)	4.9
Coffee	8.9	7.3	26.2	5.2	32.9 (7)	5.7
Tea	5.4	7.4	16.0	6.3	24.7	16.7 (3)
<u>Grains</u>						
Maize	6.2	5.8	23.3	11.5	19.7	7.3
Rice	9.0	5.7	44.7 (4)	17.9 (4)	30.8 (8)	10.3 (9)
Wheat	5.1	5.0	32.8 (8)	13.4 (10)	26.0	9.1
<u>Foodstuffs and oils</u>						
Fishmeal	14.5 (9)	11.5 (9)	33.8 (7)	15.6 (7)	27.1 (10)	7.2
Groundnut cake	5.0	4.3	28.8	14.1	21.9	7.6
Groundnut oil	8.2	8.6	24.2	9.0	26.0	6.3
Palm oil	11.4	14.0 (7)	25.6	9.3	26.4	8.8
Soybeans	7.7	7.0	24.1	9.9	20.9	6.2
Soybean meal	4.0	3.2	32.2 (9)	14.8 (8)	24.0	7.2
<u>Other food</u>						
Bananas	6.7	5.9	8.9	5.9	14.4	7.0
Beef	13.5 (10)	8.8	31.3 (10)	19.9 (3)	27.1	6.2
Lamb	7.3	6.0	9.2	3.0	16.6	4.2
Sugar	62.5 (1)	106.3 (1)	85.0 (1)	41.2 (1)	88.4 (1)	16.2 (1)
Petroleum	1.5	1.7	41.8 (6)	2.5	55.3 (2)	3.6
All commodities (d)	3.6	3.3	14.6	5.2	17.6	5.0

Source: Calculated from data in International Monetary Fund, *International Financial Statistics Yearbook, 1980*, Washington: International Monetary Fund.

- (a) Numbers in brackets represent rank position of ten most unstable commodities and copper.
 (b) I = instability index.
 (c) IG = instability and growth index (see Chapter 4).
 (d) Based on most of the commodities in the table as computed by the IMF.

Table 5.9 Indices of commodity price (instability: relative values, 1960-79 (a) (b)

(Percentages)

	1960-69		1970-79		1960-79	
	I (c)	IG (d)	I (c)	IG (d)	I (c)	IG (d)
<u>Metals</u>						
Aluminium	2.2	2.2	13.7	16.5	10.8	15.5
Copper	17.0 (6)	7.3 (19)	18.5 (14)	47.4 (7)	35.6 (4)	55.5 (1)
Iron ore	4.4	7.2	7.0	13.2	7.2	19.6
Lead	17.6 (5)	12.2 (10)	19.4	18.6	19.6	16.6
Nickel	6.0	5.1	7.4	11.4	13.9	12.9
Tin	13.1	10.6	10.7	7.3	13.8	10.6
Zinc	14.6 (8)	12.0	38.0 (3)	57.6 (3)	33.1 (5)	28.7
Copra	9.1	8.3	35.1 (5)	38.7 (10)	25.5	33.0 (10)
<u>Industrial "softs"</u>						
Cotton	3.6	3.9	16.2	19.9	12.5	14.5
Hides	16.1 (7)	18.8 (6)	31.6 (8)	26.4	25.6	22.1
Jute	19.6 (3)	19.5 (5)	8.8	20.4	19.6	47.1 (4)
Rubber	11.3	19.7 (4)	15.7	15.9	16.2	35.5 (7)
Sisal	23.9 (2)	45.1 (2)	48.4 (2)	42.3 (9)	40.1 (2)	52.2 (2)
Wool	12.8	20.6 (3)	28.2	29.6	21.9	47.4 (6)
<u>Beverages</u>						
Cocoa	19.2 (4)	14.2 (8)	23.3	9.7	25.8 (10)	12.6
Coffee	9.0	8.2	28.8	18.5	23.0	15.0
Tea	13.1	10.6	24.3	18.8	14.9	37.4 (5)
<u>Grains</u>						
Maize	5.9	6.1	15.5	24.9	14.3	19.9
Rice	9.2	6.5	34.8 (6)	45.4 (8)	27.8 (9)	34.9 (8)
Wheat	5.5	6.0	25.8	24.5	19.7	25.8
<u>Foodstuffs and oils</u>						
Fishmeat	14.4 (9)	12.6 (9)	35.3 (4)	52.9 (4)	31.0 (7)	30.8
Groundnut cake	4.9	4.7	30.8 (9)	49.2 (6)	27.8	34.9 (9)
Groundnut oil	8.0	9.2	16.1	19.6	15.2	13.8
Palm oil	11.2	15.2 (7)	17.9	21.4	15.9	19.8
Soybeans	7.4	7.5	22.5	30.3	18.9	20.9
Soybean meal	4.0	3.6	34.2 (7)	51.1 (5)	28.0 (8)	31.6
<u>Other food</u>						
Bananas	6.7	6.6	10.0	14.2	11.1	20.4
Beef	13.3 (10)	9.6	29.2 (2)	60.7 (2)	32.7 (6)	28.1
Lamb	7.1	6.5	11.6	12.4	10.1	9.4 (3)
Sugar	62.7 (1)	118.3 (1)	67.5 (1)	106.5 (1)	75.3 (1)	51.6 (3)
Petroleum	1.3	1.7	30.5 (10)	6.1	35.9 (3)	8.7
All commodities	3.3	3.4	10.4	12.1	8.1	9.5

Source: Calculated from data in International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington: International Monetary Fund.

- (a) Deflated by "all commodities" weighted average price index.
 (b) Numbers in brackets represent rank position of the ten most unstable commodities and copper.
 (c) I = instability index.
 (d) IG = instability and growth index (see Chapter 4).

during the 1970s and its price therefore registers as highly unstable according to the simple instability index, I. However all the price changes were increases so that the composite index, IG, registers an extremely low value for petroleum relative to other commodities.

Table 5.9 shows values for the indices calculated on the basis of commodity prices "deflated" by an index of world export unit values thus allowing an assessment of the instability of the international purchasing power of each commodity relative to the prices of the goods which comprise the major part of international trade (this concept is developed in the next section - 5.5.4). Both tables show the rank position of each of the ten most unstable commodities (and copper where this occupies a lower position) according to the appropriate index in each period.

There is limited uniformity of behaviour among commodities, between time periods, between the indices used, or according to whether current prices are used, and it is not intended to discuss the results of the two tables in detail. However it is noted that sugar appears to have been the most unstable in terms of price regardless of the index, period or valuation used, with the exception of the index IG in the twenty year period when deflated prices are used (Table 5.9). During the 1960s petroleum showed considerable stability of price, and then became rather less stable as measured by the simple index, I, in the subsequent period. It is of interest to note that "soft" industrial raw materials (copra, cotton, etc.) appear as a group to have been rather more unstable; in particular sisal in the

years 1960-79 is the second most highly unstable of all commodities in terms of its deflated price as measured by IG. Similarly rubber prices, while not seeming particularly unstable according to I, yield a relatively high value of IG due to the fall in real and nominal values from 1960 to 1973. Only after the oil price rises of the mid-1970s did rubber prices stage a partial recovery, since synthetic rubber, a good substitute for natural rubber is a by-product of petroleum refining and their prices move together. The beverages - cocoa, coffee, and tea - are frequently associated with instability and although one or other appears among the ten most unstable in most rankings, the pattern is not consistent and any instability which occurred was around a rising trend; with the exception of tea whose price fell sharply in real terms, and hence yielded a relatively high value of IG.

Both tables show that although copper was more unstable than other commodities during the years 1960-69 according to the simple index I, this instability occurred around a rising trend so that the value of IG is reduced relative to other commodities. The pattern is reversed in the years from 1970-79 when copper's IG value is among the highest, and for the twenty year period copper is seen to be the most unstable commodity as measured by IG. Thus various points noted earlier are confirmed: firstly, that the 1960s represented an exceptionally favourable period for copper prices; secondly, that copper prices fell sharply in real terms during the 1970s - more so than most primary commodities; and thirdly, that

its prices were highly unstable during the 1970s both with respect to previous periods and to other commodities.

In conclusion it is noted that zinc and lead, both minor exports from Zambia, also showed relatively high values of I and IG at various stages, particularly during the years 1970 to 1979.

5.5.4 The international purchasing power of copper. A concept which is analogous to the net terms of trade for a country (normally defined as the ratio of export to import unit values) is the amount of a typical unit of imports which can be purchased with the value of one unit of a commodity exported. This latter concept is described here as the international purchasing power of a commodity. A final investigation was made into the comparative movement of various commodities' international purchasing power with the intention, firstly of determining the extent to which the purchasing power of copper has varied during the period 1960-79 and secondly to compare it with other commodities. This international purchasing power, IPP, is defined as:

$$IPP = \frac{P_c}{P_m}$$

where P_c is the price index of the commodity in question, and

P_m is the value of a typical unit of imports.

In this study P_m is approximated by the index of world export unit values used in the previous section to produce the indices of deflated price (see Table 5.9) (17).

In order effectively to compare the performance of the 31 commodities involved each price series was deflated and trend growth

rates (18) calculated for three selected periods and the twenty years 1960-79. These growth rates are presented in Appendix S, Table S.3.5 and summarized in Table 5.10. Three shorter periods were chosen in preference to the two longer periods used in section 5.5.3, in order more accurately to reflect the change in the patterns of commodity price movements relative to world prices, with particular reference to the years after 1973 frequently referred to as the "commodity price boom".

As was found in previous sections the secular behaviour of copper prices shows marked variation, with a growth rate in the period 1960-66 of 15.1 per cent, considerably higher than that of any other commodity: the second most rapid average growth rate, 8.2 per cent, was recorded for lead (another of Zambia's exports, though of little significance relative to copper). In marked contrast it is found that after 1966 the real purchasing power of copper declined very sharply, particularly in the years after 1973. The decline was large relative to most other commodities as shown by the consistently low ranking of copper, in the latter two periods, and consequently during the twenty years as a whole. Thus during the period under review the international purchasing power of copper fell at an annual average rate of 2.3 per cent, somewhat faster than the decline of the all commodity index of 0.8 per cent. The latter result is of wider significance for primary producing countries since it implies that the average purchasing power of primary commodities has declined since the 1960s, though inspection of the component periods shows

Table 5.10 Trend growth rates (a) of the international purchasing power of copper relative to 30 primary commodities

(Percentages)

	"All commodities" Index (b)	Lowest commodity	Highest commodity	Copper	Rank position of copper (c)
1960-66 (7 years)	0.68	-7.52 (rubber)	15.09 (copper)	15.09	1
1966-73 (8 years)	0.35	-7.50 (tea)	21.5 (sugar)	-4.97	29 (d)
1973-79 (7 years)	-4.56	-21.00 (sugar)	11.77 (petroleum)	-11.78	27 (e)
1960-79	-0.83	-5.11 (iron ore)	7.73 (petroleum)	-2.30	25 (f)

Source: Calculated from Appendix S, Table 5.3.5.

- (a) Exponential trend growth rate - see Appendix III.3.
- (b) Index calculated by IMF based on the 31 commodities included here.
- (c) Growth rates of copper and the 30 other commodities ranked in descending order of magnitude.
- (d) Commodities with lower ranking: jute, tea.
- (e) Commodities with lower ranking: rice, sisal, sugar, wheat.
- (f) Commodities with lower ranking: bananas, iron ore, jute, rubber, tea, wool.

that the trend growth rate became negative only after 1973. Copper on the other hand, had been declining since 1966.

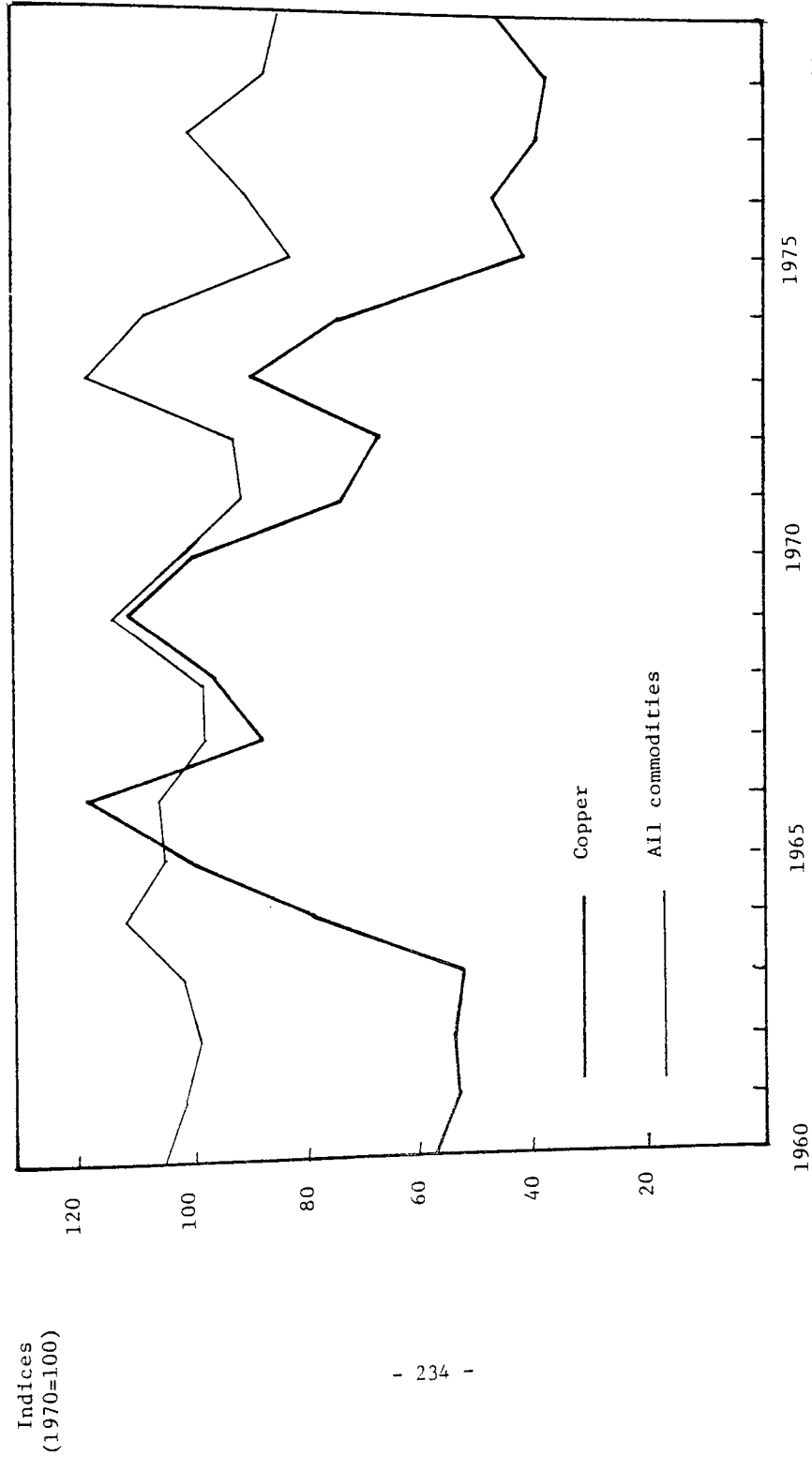
This eccentricity of the movement of the copper price is further illustrated by reference to Figure 5.5 which shows the extent to which its decline has exceeded that of the all commodities index, with 1970 taken as base year. However it should also be recalled from section 5.5.2 that prices during the period 1965-74 were shown to be somewhat in excess of the long term trend. Nevertheless, the figure does much to explain one of the reasons for the external financial constraints which arose after 1973 in particular; that is, the decline in prices since the mid-1960s, the early years of Zambia's independence.

The international purchasing power of most primary commodities declined as a result of global inflation during the 1970s raising the price of producing countries' imports, and recession in the industrial countries depressing the prices of their exports (particularly of industrial raw materials). Copper was one of the most seriously affected in this way.

5.6 Influences on the price of copper

There are strong a priori grounds for suggesting that the price of copper is sensitive to the level of excess demand in the industry, the most obvious proxy variable for which is the extent of change in the level of stocks. Stock levels will vary according to the balance between production and consumption, rising when demand is low

Figure 5.5 Indices of international purchasing power (a): Copper and all commodities, 1960-79



Source: Calculated from data in IMF, International Financial Statistics Yearbook 1980, Washington, D.C.: International Monetary Fund.

Note: (a) Price deflated by index of world export unit values.

relative to supply and vice versa. Mikesell (1979, pp. 182-5) discusses the role of stocks as a causal factor in short and medium term variations in the price of copper. He also makes the important point that their full role is obscured by the inadequacy of data on stock levels, with substantial variations in the estimates of "world" stocks between several major sources.

Reference to Appendix S, Table 5.3.7 shows that there are many different categories of stocks: metal exchange stocks, stocks held by producing or consuming companies or merchants, stocks of blister and finally the stockpiles of refined copper held for strategic reasons by governments (mainly the USA). Although the management of the latter is not necessarily influenced by purely commercial factors its influence on the supply-demand balance cannot be ignored. In the case of another metal, tin, Nappi (1979, pp. 47-50) has suggested that the existence of such strategic stockpiles exerted greater influence over the tin prices than did the formal price stabilization scheme, the buffer stock which has been in existence since 1954. It would therefore be wrong to exclude the strategic stockpiles of copper from any consideration of the influence of world stock levels on the international price of copper, although in relation to total world production the stockpiles of copper are a very much smaller proportion of total world production than is the case for tin (19). Stocks of copper in blister form have shown a remarkable stability when compared with forms of stockholding, and this suggests that there is a certain minimum level which is held by producers, refiners, and fabricators, and that the price elasticity

of this form of copper is low. Because of this, and since blister is of a different form and purity to refined copper (see Appendix V.1) stocks of blister are not considered further here.

Appendix S, Table S.3.7 indicates that there has been a large increase in total copper stocks in the world market particularly in the years since 1970, although there is considerable variation among the different types of stocks. It is also the case that stock levels vary in line with prices, but that the correlation between these variables has diminished in recent years. These observations are borne out by Table 5.11 which contains coefficients of correlation (R) between the "real" price of copper (20) and the levels of various types of stocks, based on the hypothesis that excess supply (rising stocks) is translated into a copper price which falls relative to world prices (as measured by an index of world export prices). The extent of correlation between prices and stock levels varies between -0.5 and -0.8 (with one exception) which suggests that there exists a relationship between the two, but that further variables are necessary to provide a full explanatory model of prices.

The correlation coefficients between absolute stock levels and prices were generally higher than the correlation between changes in the two variables. It is possible that the rate of change variables might more truly reflect the complex reactions between prices and stocks, but a simultaneous equation system might be necessary to capture the effects. Similarly no change was made by calculating the correlation coefficient between prices and the ratio of total stocks

Table 5.11 Association between relative copper prices (a)
and various categories of stocks of refined copper (b)

	Period	R (b)
A. Price and LME (c) stocks	1965-80	-0.667
	1970-80	-0.533
	1973-80	-0.427
Price and Metal Exchange stocks	1970-80	-0.616
	1973-80	-0.519
B. Price and "countries" (d) stocks	1965-80	-0.783
	1970-80	-0.726
	1973-80	-0.761
Price and producers stocks	1973-80	-0.757
Price and consumers stocks	1973-80	-0.729
C. Price and total commercial stocks	1966-80	-0.777
	1970-80	-0.693
	1973-80	-0.654
D. Price and total refined stocks (e)	1966-80	-0.730
	1970-80	-0.645
	1973-80	-0.602

Source: Calculated from Appendix S, Table S.3.7.

- (a) LME prices deflated by index of world export unit values.
- (b) Relationship measured by the coefficient of correlation R.
- (c) London Metal Exchange warehouse stocks.
- (d) Held by companies: producing, consuming or merchants.
- (e) Includes USA General Services Administration stockpile.

to world consumption in each year. Such a change would have been expected if the growth of stocks was due to a rapidly increasing world market for copper. This was not the case. The use of actual (current) prices in place of "real" prices invariably reduced the correlation coefficients to values of the order of 0.1. The contrast shows that the markets react to rising "world" prices, but that the "overhang" of stocks has exerted strong downward pressure on prices.

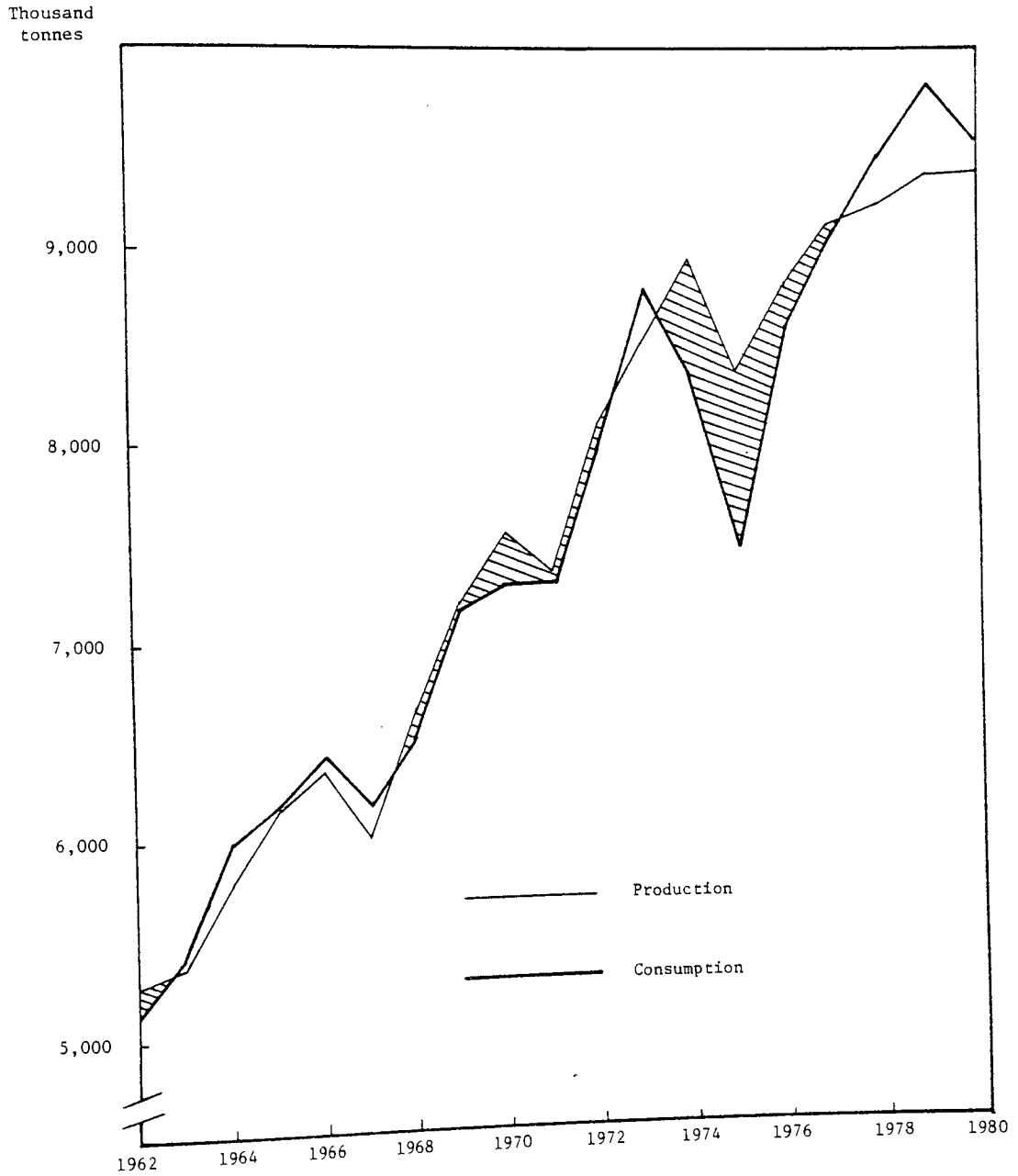
The results of Table 5.11 suggest that prices are influenced by world market conditions, but that there is need to introduce other variables, and possibly to consider absolute production and consumption levels in a simultaneous equation model rather than simply the difference between the two represented by changes in stock levels. Also, a more disaggregated approach might be of use, with supply and demand in individual countries or groups of countries being studied. Finally it is suggested that the use of a deflated price series may accord too high a significance to the level of international inflationary pressures on the price of copper, and that a more appropriate procedure might be to use current prices as the dependent variable with a suitable index of international inflation as one of the explanatory variables.

The variations in copper stocks are explained by the balance of supply and demand. Unfortunately data limitations mean that it is not possible to construct a series of changes in stocks which is equal to the difference between production and consumption in a particular year, as reference to the appropriate columns of Appendix S,

Table S.3.6 will demonstrate (21). It is therefore useful to consider the trends of production and consumption during the period under review, as revealed by Table S.3.6 and represented graphically in figure 5.8. It is immediately apparent that excess supply prevailed in the copper industry for the prolonged period 1968-77 with the exception of 1973. In the preceding years of the 1960s excess demand had existed, which considered together with the prevailing low stock levels, does much to explain the high "real" prices in that period. The extent of the varying market developments is further illustrated by Table 5.12, which summarizes trend growth rates in particular periods.

In the years 1962-67 the growth of production falls short of consumption, but the converse applied in the subsequent two periods especially in the early 1970s when output grew almost twice as fast as demand. A further reversal occurred after 1975 when production recovered its 1974 level but thereafter grew only slowly: spare capacity was absorbed while new investment was very limited, a result of prices being too low. Thus Mikesell (1979, p. 128) cites the opinion of industry sources that a price of US\$0.90 to US\$1.00 per pound (£1000 to £1100 per tonne with £ = US\$2) in 1975 values would be necessary to stimulate new investment. As will be seen by reference to Appendix S, Tables S.3.6 and S.3.7 "real" prices have failed to achieve this level in terms of annual averages, with the consequence that little investment has been undertaken in new mining developments.

Figure 5.6 World production and consumption of copper, 1962-80



Source: Appendix S, Table S.3.6.

Table 5.12 Trend growth rates of production and consumption
of refined copper

(Percentages)

	Trend growth rates (a)	
	Production	Consumption
1962-67	3.6	4.2
1967-71	5.4	4.6
1971-76	3.0	1.6
1976-80	1.6	3.0
1962-80	3.5	3.4

Source: Calculated from Appendix S, Table S.3.6.

(a) Calculated by method outlined in Appendix III.3.

The question remains as to the factors which cause variations in the levels of consumption and production. A simple investigation was made of the links between the levels of consumption and economic activity in the industrialized countries as well as the level of copper prices. In addition the relationship between the level of production and prices was explored. The results of bivariate regressions using linear and log-linear models for each of the three relationships are shown in Table 5.13. The latter, log-linear form has the advantage that a measure of elasticity is immediately available in the form of the "b" coefficient.

A statistically highly significant relationship was discovered between the level of world consumption and the gross national product of the industrial countries. In the log-linear form the b-coefficient was not significantly different (even at the 10 per cent level) from 1. Thus, approximately unit income elasticity of demand exists in respect of the world demand for refined copper, and it is reasonable to say that demand is fairly highly responsive to variations in the international economy. The price elasticity of demand is considerably less than one as indicated by the b coefficient of -0.324 in equation 4 of Table 5.13. Thus, in the short term at least, demand for copper is seen to be relatively responsive to changes in the level of global economic activity, but little affected by variations in price. Similarly reference to equations 5 and 6 in Table 5.13 suggests that the output of copper is price inelastic, probably a result of technical conditions in the industry

Table 5.13 Determinants of supply and demand
for refined copper, 1966-80

Equation (a)	Regression coefficients				
	a	b	t _b (b)	R ²	F (b)
1. Con. = a+bGNP	7.951	0.881	14.26	0.9399	203.4
2. Con. = a(GNP) ^b	1.331	0.929	14.08	0.9385	194.0
3. Con. = a+bP	164.7	-0.566	3.31	0.4569	10.94
4. Con. = aP ^b	482.5	-0.324	3.29	0.4541	10.81
5. Prod. = a+bP	167.8	-0.575	3.71	0.5143	13.77
6. Prod. = aP ^b	504.4	-0.329	3.59	0.4989	12.95

Source: Calculated from Appendix S, Table S.3.6.

- (a) Con. - index of world consumption;
 Prod. - index of world production;
 GNP - index of gross national product of industrialized countries;
 P - index of LME copper wirebars cash settlement prices.
 Full definitions in source table.
- (b) All results significant at least at 1 per cent level

which make it virtually impossible to vary output without permanent closure of mining installations.

The conclusions relating to demand elasticities are borne out by the more detailed investigation of Bozdogan and Hartman (1979, Tables 5-7, p. 155), who cite the results of several studies, including Arthur D. Little (1978), Fisher, Cootner and Baily (1972) and Charles Rivers Associates (1970). These studies generally show elasticities which are lower in the short term than in the long term, low own-price elasticities of demand, but rather higher (but positive) cross-price elasticities (usually with respect to variations in the price of the most important substitute, aluminium), and still higher "activity variable" elasticities of demand (22). It is also noted that the linear form of the supply equation used in equation 5 of Table 5.13 marks the starting point for Mikesell's own (1979, pp. 164-186) review of econometric models of supply in the world copper industry. The relationships introduced in Table 5.13 require rather greater investigation in the context of multi-variate simultaneous equation models. However as Bozdogan and Hartman (1979) note, there are very substantial econometric problems in the specification and identification of these models, as well as the difficulty of ensuring that the data series (e.g., for demand or price) accurately reflect market conditions. For instance they suggest that price series in the USA are list prices which may differ substantially from actual transactions prices. However this is a problem which is rather greater in the USA than in the rest of the

world because of the existence of the two-price system in the US copper market.

5.7 Conclusion

The conclusion which may be drawn from this investigation of the international copper industry since the mid-1960s is that substantial excess capacity existed until the late 1970s, when there is evidence of the emergence of excess demand. The large accumulation of stocks which resulted is believed to have been a major cause of the low relative prices which characterized the copper market throughout the 1970s, and also may account for the finding that copper was one of the most unstable commodities (in terms of price). It has also been noted that the demand for and supply of copper both show low own-price elasticities, but that the demand for copper is fairly income elastic. On this basis the medium term outlook for copper prices (say up to 1985) is unclear: in the sense that the "overhang" of stocks has been reduced, with limited investment in new capacity the outlook is optimistic; on the other hand, the rate of growth of economic activity in the industrial countries is not widely expected to be rapid so that the growth of demand for copper is likely to be slow. Because of the relatively high cross-price elasticities with respect to substitutes like aluminium any unwarranted price rise in copper could result in permanent shifts in demand patterns in favour of substitutes.

Notes

1. See section 2.4 and Table 2.4 in Chapter 2.
2. Many of these commodities are complements to other commodities forming a small proportion of the final product by volume, but important for their physical or chemical properties. A good example of this is cobalt, critical in the manufacture of aircraft engines and certain electro-magnetic applications, for which no substitute has been developed. Most of the non-socialist world's supply of cobalt comes from Zaire and Zambia, both developing nations. Other cases are manganese, magnesium, chromium, and to a growing degree, uranium.
3. Conseil Intergouvernemental des Pays Exportateurs de Cuivre; English equivalent Inter-Governmental Council of Copper Exporting Countries.
4. For fuller explanation of the terms refer to Appendix V.1.
5. The sharp drop in Zaire's refined output relative to mine output between 1975 and 1979 is probably a result of the "Shaba rebellion" in which large number of foreign technicians left Zaire and other disruptions occurred, thus reducing the countries refining capacity.
6. See Mikesell (1979), Chapters 5 and 6, and Mezger (1980), Chapter 2.
7. The "settlement price" is the official cash sellers price announced by the LME's quotations committee at the close of the "second ring" of each morning's trading session. The price is the last best seller's offer price and is paralleled by a buyer's bid price, as well as a "three months", i.e., forward price.
8. Practices vary concerning the exact price paid for delivery of a consignment. For instance, some contracts provide that the supplier can deliver at any time during a notified month (or fortnight) and that the producer must elect at the time of receipt of notice the date within the period whose price will be used in final settlement. Most sales of Zambian copper take place on this basis.
9. For instance the International Commodities Clearing House (ICCH) which operates in several London futures markets in "softs".
10. See "South", June 1981, pp. 80-82.

11. A fuller explanation of these indices is provided in Chapter 4.
12. See Mikesell (1979), pp. 111-116.
13. The indices used here are identical in form to those defined in equations (4.5) and (4.13). Subscripts have been dropped for simplicity. In the case of equation (4.5) the curve used is the exponential (log-linear time trend). Full explanation of the rationale appears in Chapter 4.

14. This trend growth rate, \hat{r} is estimated as

$$\hat{r} = e^{\hat{b}} - 1$$

where \hat{b} is the least squares estimate obtained from the estimation of the exponential trend curve

$$x_t = ae^{bt}.$$

15. The copper price is deflated in order to provide an estimate of its international purchasing power for a producing country like Zambia. The deflator used was an index of UK wholesale prices constructed from United Kingdom Board of Trade and Department of Industry indices (see Appendix S, Table S.3.4 for detailed sources). This deflator was used partly because indices of prices of internationally traded goods are not available for the entire period. Elsewhere in this study more appropriate deflators are used to calculate the commodity terms of trade. Nevertheless the UK index is felt to be reasonably representative of the international rate of price change, especially in the earlier part of the series when the UK was more prominent in the international economy.
16. The semi-logarithmic scale gives equal visual weight to equal proportional changes in contrast to the arithmetic scale which shows equal absolute changes as the same distance.
17. International Monetary Fund, International Financial Statistics Yearbook, 1980.
18. Calculated according to the procedure outlined in Appendix III.3, i.e., the exponential trend growth rate.
19. Figures given by Nappi (1979, p. 48-50) show that at a maximum in 1962 the General Services Administration stockpile of tin was 349,000 tons, fifteen times greater than the buffer stock and 2 1/2 times world production in that year. By contrast the GSA stockpile of copper has never exceeded 7.0 per cent of world output or about two-thirds of total stocks (in 1965).
20. The price of copper deflated by an index of world export unit values as was done in section 5.5.

21. See Appendix S, Table S.3.6, columns showing absolute change in stocks and difference between production and consumption.
22. The "activity variables" referred to are usually indices of production in manufacturing industry or sub-sectors such as durable goods. Selected elasticities of demand from the work cited by Bozdogan and Hartman (1979) indicating the range of values obtained in six studies are:

Elasticity of demand:	Short-term	Long-term
Own-price	-0.12 to -0.47	-0.39 to -2.88
Cross-price (aluminium)	0.20 to 0.66	0.84 to 6.30
Activity variable	0.15 to 1.30	0.73 to 3.56

CHAPTER 6 THE ZAMBIAN MINING INDUSTRY

6.1 Introduction: the state takeover

It was noted in Chapter 2 that significant commercial mining operations started in 1926 mainly under concessions granted to the British South Africa (BSA) Company, which continued to be heavily involved in the production of copper literally up to the eve of Independence (1). An extensive description of the historical development of the mining industry up to independence in 1964 is provided by Slinn (1972), including the role of the BSA company and its successor, the Chartered Company. The mineral rights were transferred to the Zambian government only in 1964, having been up until that time in the hands of these companies, and the subject of prolonged negotiations between the company and the Northern Rhodesian government.

Despite this transfer of mineral rights to the new Zambian government, the operation of mining activity remained in private hands until 1970, when the intention of the government to acquire a majority shareholding in the mining companies, first announced in 1969, was realized. At the time of the transfer the corporate structure of the Zambian mining industry was highly fragmented, with each mining activity being operated by a separate company. The ownership of most of these companies was complex, but ultimately held by a half dozen British, American and South African companies, many of which were themselves interconnected (2). The background to, process of and sequel to the takeover is extensively documented in Bostock and

Harvey (1972). Thus the partial nationalization which was effected during 1970, served to realize two objectives: to rationalize both the production and ownership structures of the industry within the industry; and ostensibly to enable the government to exercise greater control over the operation of the industry.

The first objective was realized by the government's acquisition of majority shareholdings in most of the Zambian mining companies, which were consolidated into two operational companies in each of which the government originally took a 51 per cent share. The larger of these, Nchanga Consolidated Copper Mines (NCCM) has as its minority shareholder Zambia Copper Investments Ltd., a subsidiary of the Anglo-American Corporation of South Africa. The other company, Roan Consolidated Mines Ltd. (RCM), is partly owned by AMAX Incorporated (of New York), Zambian Copper Investments and private shareholders, with shares traded on the London Stock Exchange. The government's share is vested in the state holding company, Zambia Industrial and Mining Corporation (ZIMCO), which is the ultimate owner of a large proportion of all Zambian industry. ZIMCO's 1977 Annual Report shows that its gross turnover in 1977 was equal to nearly 70 per cent of gross domestic product (its report does not permit estimation of its value added). The two mining companies' 1978 Annual Reports show that NCCM's net fixed assets were worth K518 million, while RCM's were worth K393 million (about £300 million and £230 million respectively). The government's original shareholding of 51 per cent in each company was increased during 1979 to approximately 60 per cent as a result of the government's decision to convert a certain amount of outstanding

loans to the companies into share capital in an attempt to ease their severe liquidity problems. The minority shareholders were offered, but refused, the option to increase their investment equiproportionately. The need for this action will become clearer later in this chapter when the financial position of the companies is discussed.

The extent to which the government was able to exert control over the policies of the companies was weakened by the initial granting of management contracts to companies directly linked to the minority shareholders (RST Management Services and Anglo-American (Central Africa)). A further limitation on the government's freedom of action was imposed by the method of paying compensation to the foreign shareholders: an issue of 6 per cent ZIMCO loan stock was made directly to the shareholders to be redeemed by 1978 in the case of RCM and 1982 for NCCM. During the currency of this loan stock no further amendments were to be made to various laws of Zambia which might affect the interests of the shareholders, and in particular this related to the new taxation and foreign exchange control arrangements which were introduced at the time of the takeover. Thus the day to day running of the companies remained very much in the hands of the minority shareholders, while longer term policy decisions by the government were heavily circumscribed by the terms of the takeover agreements. A full discussion of the terms of the takeover are provided by Bostock and Harvey (1972, Chapter 7, and Appendices A and B, from whose accounts much of the material of this section has been drawn).

Mezger (1980) suggests, without documented numerical support, that nationalization resulted in Zambia, as elsewhere, in an increased transfer of profits. This is almost certainly true in the sense that payments of interest and principal were being made, in addition to the externalization of dividends and payments in respect of management contracts. Although by the end of the 1970's the companies' profitability had declined to such an extent that no dividends at all were being paid either to the government or to the foreign shareholders, the latter still emerged relatively more favourably in the sense that the government felt it necessary to support the companies with very substantial loans, with no corresponding support from the minority shareholders. Thus the government, acting effectively as a lender of last resort, carried a disproportionate share of the burden of the liquidity crisis in the mining companies.

However, in 1973, well before the financial deterioration in both the mining companies and the government itself, the authorities decided that more complete control should be assumed by the government. In order to do this the entire issue of ZIMCO loan stock and bonds was redeemed and the management contracts were terminated, despite the cost that this would impose on the companies. To assist in redeeming the bonds two substantial loans were taken from the Bank of America (US\$50 million) and Morgan Guarantee Trust (US\$100 million) with repayment concentrated in the period 1976-83. It seems that this decision was based on current optimistic expectations about the future prices of copper, in the belief that such borrowing would not

impose an undue burden of debt service on the country's foreign exchange earnings. These expectations were shown to have been unrealistic within less than a year as the price of copper declined in the second half of 1974. The termination of the management contracts implied that compensation would have to be paid to the service companies and this was settled by a series of annual payments by each of the companies terminating in 1978. Although the cost was formally borne by the mining companies, it represented a tax-deductible production cost so that a large part of the cost indirectly fell on the government in the form of lost tax and dividends. Thus it is seen that the government's hopes and intentions in respect of the partial nationalization of the mining companies have either not been realized or have been far more costly to achieve than was originally expected. The remainder of this chapter is devoted to a discussion of the changing financial circumstances of the mining companies, concluding with a return to the consideration of the question as to whether their performance and the economic benefits accruing to Zambia would have been any different under private ownership.

6.2 Financial crisis in the mining industry

The decline of international copper prices expressed in both current and "real" terms, documented in Chapter 5 was translated into the decline of the financial position of the mining industry from one in which returns were high to a situation in two years when both companies made pre-tax losses. Table 6.1 shows the extent of this decline for the two parastatal mining companies in the years since

Table 6.1 Rates of return on net assets of Zambian mining assets

(Percentages)

Financial year (b)	NCCM		RCM	
	Gross (c)	Net (d)	Gross (c)	Net (d)
1970/71	48.4	23.0	40.3	23.4
1971/72	26.8	18.2	21.4	17.2
1972/73	23.8	19.9	27.0	17.2
1973/74	60.8	24.9	73.1	26.1
1974/75	25.2	10.8	11.9	9.4
1975/76	-9.3	0.8	-4.0	-0.1
1976/77	14.4	0.4	9.3	5.7
1977/78	-5.5	-1.6	-1.7	-2.5
1978/79	4.0	4.0	14.0	14.0
1979/80	19.3	8.3	18.0	15.0
1970/71 to 1979/80				
Mean	20.8	11.1	20.9	12.5
Standard deviation	21.9	10.6	22.4	9.4
<u>Memorandum item:</u>				
1960-69				
Mean	43.8	25.8	33.2	19.8
Standard deviation	8.7	8.9	11.3	7.5

Source: 1970-80: Calculated from Appendix S, Tables S.4.1, S.4.2 and S.4.3.
1960-69: Calculated from Daniel (1979), Table 4.1, page 78.

(a) Rates of return calculated on total net assets employed at each financial year end.

(b) The figures are based on the companies' financial years without adjustment: NCCM - April to March (except 1970/71 which was 15 months) and RCM - July to June (except July 1979 to March 1980). Figures are not exactly comparable.

(c) Profit before taxation and depreciation but after interest charges.

(d) Profit after taxation. Depreciation charges were not identified in the company accounts until 1978/79 for NCCM and 1979/80 for RCM.

their formation in their present form. It is apparent that a very substantial deterioration occurred; but it is also true that there was a marked degree of instability in the rate of return, following naturally from the variation in the realized price of copper. Data obtained from Daniel (1979) and summarized in the memorandum item of Table 6.1 suggests that during the 1960s the average rates of return were rather higher than during the 1970s, and that in the former period there was significantly less variation from year to year. Indeed it is found that the lowest rates of return were of the order of 21 per cent (gross) and 13 per cent (net), and returns were typically in excess of 30 per cent and 20 per cent respectively. The data makes it clear that the problem became acute in the financial year 1975/76 (3). This can be directly attributed to the fall in copper price which, as was seen in Chapter 5 commenced in the latter half of 1974; prices fell from a peak of £1400 per tonne to about £500 in January 1975. Prices subsequently failed to recover their former real international purchasing power (as shown by Figure 5.5 and data in Appendix S, Table 5.3.6). Indeed the decline had become evident in the year 1974/75 at least in the case of RCM, whose gross return fell to 11.9 per cent. In the four subsequent years both companies' rates of return (both gross and net) fell to levels which were unacceptable by any formal commercial standards, with both companies incurring pre-tax losses in 1975/76 and 1977/78. Favourable tax arrangements enable the companies to offset past losses against profits, as shown by the slightly smaller net rates of loss in those years. The higher rates of return in 1978/79

onwards are probably due to higher cobalt production and prices, since the international purchasing power of copper did not rise significantly (see Figure 5.5), even though nominal prices may have risen.

The marked similarity in the performance of the two mining companies goes some way to counteracting the argument that the problems of the mining industry in Zambia have been caused by nationalization or by internal mismanagement in the companies. Any annual difference between RCM and NCCM in the rates of return is due to the fact that until 1980/81 the two companies' financial years were not synchronized, and to variations in technical conditions and product mixes between the companies. It would appear however that RCM made the more rapid and stronger recovery in the years from 1978/79, probably a result of the company's larger relative sales of cobalt during this period. Whether this marks any permanent change in the companies' relative performance cannot yet be determined.

The deterioration of the companies' profitability is shown by a large array of financial indicators: the decline in current asset ratios, stagnation of financial reserves, the cessation of payments of tax to the government and dividends to share-holders, the curtailment of investment programmes, and perhaps more significantly from a fiscal and monetary management point of view, the emergence of the mining companies as major short-term borrowers from the domestic banking system. On the latter point it should also be noted that these companies became substantial borrowers in the

international money markets in order to finance even their substantially reduced capital investment programmes.

Although both companies experienced substantial reductions in their rates of return on assets employed, both have managed to maintain financial solvency, as is shown by the current asset ratio in Table 6.2 (4), with the sole exception of RCM in 1976/77, for which this ratio was 0.96 at the end of the financial year. It is however noticeable that there was a decline in the current asset ratios of both companies, occurring more or less in parallel. The weaker performance of NCCM in 1973/74 seems to have been a temporary aberration. As was the case with the return of profitability, the current assets ratio improved rather more quickly for RCM, although again there is insufficient data to decide whether this company has achieved a permanent improvement in its position relative to NCCM. A further feature, not apparent from Table 6.2 but which may be deduced from Appendix S, Tables S.4.2 and S.4.3, is the rapidity of the growth of both companies' current assets and liabilities relative to total assets in the period under review: RCM's current liabilities grew by about 225 per cent in the period 1971 to 1980 while its net fixed assets increased by about 155 per cent.

One of the main components of current liabilities is the item "short-term borrowing", and it is this item which has increased the most rapidly, as the appropriate columns in Table 6.3 show. As the mining companies' financial position deteriorated they resorted increasingly to borrowing from the banking system - and this not

Table 6.2 Current asset ratios (a) of Zambian mining companies

Year	NCCM	RCM
1970/71	1.45	1.43
1971/72	1.54	1.64
1972/73	1.42	1.51
1973/74	1.07	1.30
1974/75	1.19	1.34
1975/76	1.20	1.12
1976/77	1.14	0.96
1977/78	1.17	1.31
1978/79	1.26	1.39
1979/80	1.22	1.43

Source: Calculated from Appendix S, Tables S.4.2 and S.4.3.

(a) Ratio of current assets to current liabilities.

Table 6.3 Indebtedness of Zambian mining companies

(Million kwacha)

	NCCM		RCM		Total		Interest charges	
	Long-term (a)	Short-term (b)	Long-term	Short-term	Long-term	Short-term	NCCM	RCM
1970/71	25.2	2.6	13.2	--	38.4	2.6	2.1	0.9
1971/72	41.1	5.9	31.5	--	72.6	5.9	2.3	1.7
1972/73	45.4	7.2	47.7	--	93.1	7.2	0.7	3.9
1973/74	41.6	26.5	48.9	--	90.5	26.5	2.7	4.1
1974/75	96.7	28.7	71.3	34.6	168.0	63.3	2.8	5.6
1975/76	139.7	111.0	72.2	75.9	211.9	186.9	15.0	10.8
1976/77	140.6	145.7	77.7	81.1	218.3	226.8	22.1	13.3
1977/78	168.5	101.1	195.3	58.6	363.8	159.7	20.8	15.3
1978/79	83.4	179.0(c)	130.2	38.9	213.6	217.9	23.1	15.5
1979/80	66.2	162.6	98.7	37.7	164.9	200.3	28.1	10.0

Source: Appendix S, Tables S.4.1, S.4.2 and S.4.3.

- (a) In excess of one-year maturity.
- (b) Maturity of one year or less.
- (c) Includes "current maturities" of long and medium term debt not previously separately identified in the accounts.

only took the normal form of overdraft and other credit facilities from the companies' bankers, but also it was found that the only source from which adequate loans could be raised was the central bank (the Bank of Zambia) itself. In the comparatively short period of about two years up to March 1978, the companies borrowed K178.2 million from the Bank of Zambia (5). Thus the mining companies were behaving in a manner similar to a government turning to the central bank as a lender of last resort, and in a more rationally planned situation it might have been expected that the companies would turn for financial support to the government (the majority shareholder), which would have found the optimal method of financing this necessary borrowing. The monetary implications of the mining companies actions will be explored in Chapter 8, but it is noted that the government did eventually agree to regularize this borrowing by transferring the loans from the Bank of Zambia to its own account, financing the borrowing by a special low interest advance from the Bank of Zambia (6). At a later stage the government converted a part of the loans into equity capital, thus increasing the state's share holding to 60 per cent in both companies as discussed in section 6.1 (7). Despite this reduction in debt outstanding to the Bank of Zambia in March 1978, the financial position of both companies was such that further borrowing from the Bank was necessary. However the issue of new lines of credit by the Bank became more strictly regulated under the 1978-80 IMF programme, and the mining companies were the subject of special credit "ceilings" within the overall limits on domestic credit expansion agreed as part of the

IMF programme. NCCM made greater use of this borrowing than RCM, as shown by much larger amount of short-term debt outstanding at the end of 1979, and the absolute increase during that year for the former company.

The extent of the financial difficulties of these mining companies is well illustrated by the increase in their total indebtedness - it rose about thirteen-fold between 1970/71 and 1977/78 and there was an almost exactly equal rise in the cost of interest payments (8). Although a large part of the companies' total borrowings was in domestic currency, there is no doubt that a significant amount of the long-term debt is owed to foreign creditors (9).

Further evidence of the deteriorating financial position in the mining companies is provided by Table 6.4. The amount of tax payable varied greatly from year to year, although the time profile has been similar for the two companies. It should be noted that the tax liability is not tabulated here in cumulative terms, so that although a positive liability is shown in 1976/77 for NCCM, this was more than offset by tax recoverable in the previous years so that no tax was actually paid in that year. The system of taxation is rather more complex than is suggested by Table 6.4, since the companies are liable to two profit-based taxes, mineral tax and income tax, with distinct charging arrangements. It is noted in passing that on existing legislation one of the two companies was forecasting in 1979 that it would not be liable to pay mineral tax for between 7 and 10 years.

Table 6.4 Indicators of financial position of Zambian mining companies

(Million kwacha)

Year	Tax accrued (a)		Dividends declared		Investment (b)		Investment expressed in 1970 prices (c)	
	NCCM	RCM	NCCM	RCM	NCCM	RCM	NCCM	RCM
1970/71	85.4	36.1	51.0	20.5	...	...	...	...
1971/72	32.1	10.7	36.0	22.0	32.1	30.6	28.1	26.8
1972/73	22.6	28.5	36.0	31.0	51.5	24.2	42.9	20.2
1973/74	164.0	144.1	67.0	44.3	62.5	14.7	44.6	10.5
1974/75	78.0	9.9	17.0	6.5	50.0	28.3	32.7	18.5
1975/76	-54.3	-9.1	--	--	30.0	30.6	16.5	16.9
1976/77	49.1	0.4	--	--	11.1	51.0	5.0	23.2
1977/78	-40.1	-0.7	--	--	7.8	46.9	3.0	18.1
1978/79	0.1	--	--	4.7	-1.4	20.5	-0.5	6.6
1979/80	75.0	17.2	9.3	15.1	29.0	10.2	...	3.0

Sources: Tax and dividends - Appendix S, Table S.4.1.

Investment - Appendix S, Table S.4.4.

Investment deflator - Appendix S, Tables S.1.3 and 3.1.4.

(a) These amounts are taxation charged to profit and loss accounts on an accrual basis for financial years. These may not coincide with "mineral revenue" shown in the government accounts which are prepared on a cash basis.

(b) "Investment" here is defined as additions to companies net fixed assets.

(c) The implicit deflator for gross fixed capital formation was used to deflate the 1970 prices.

Table 6.4 indicates that the cessation of dividends paid to shareholders followed almost exactly the same pattern as tax accruals, with RCM resuming payments rather earlier than NCCM. It is suggested that this particular feature is due to RCM's significant private individual share ownership, its quotation on the London stock market, and the consequent perceived need to maintain dividend payments to these investors in order to preserve its market valuation.

Finally with respect to Table 6.4 the decline in both nominal and real levels of investment in both companies is suggested as both cause and effect of the financial predicament of the industry. Falling profit levels and rates of return may frequently be accompanied by a curtailment of investment expenditure, especially if expectations concerning medium- to long-term profitability are pessimistic. Equally it may be argued that a fall in the volume of additions to net assets may lead to a decline in output or productivity in an industry which is prone to worsening technical conditions - declining ore grades, increasing mine depth, etc.

That there was a deterioration in the financial circumstances of the Zambian mining industry is now fully apparent, but the reasons are not so easily identified. The discussion thus far has implied that it was the secular decline in the international purchasing power of the realized price of copper which was at the root of the problem. Table 6.5 presents the coefficients of correlation between the rates of return (net) on total net assets and the "real" price of copper, that is the nominal price deflated by the index of world export unit

Table 6.5 Relationship between "real" copper prices and return on net assets (a)

Financial year	Correlation coefficient (R)				
	NCCM (b)	Rhokana Corporation	RST (c)	NCCM (b)	RCM
1960-69	-0.8465	0.2878	0.6868	...	...
1971-80	...	...	...	0.8067	0.6903

Sources: Copper prices calculated from data in Appendix S, Table S.3.6. Net return on assets: 1960-69 Daniel (1979), Table 4.1, page 48; 1970-79, Table 6.1.

(a) Index of LME average copper prices deflated by index of world export unit values and net return on net total assets.

(b) The company referred to as NCCM is not comparable before and after nationalization. From 1970 NCCM included several other companies including Rhokana.

(c) Roan Selection Trust succeeded by RCM.

(d) For NCCM ending on 31 March; for Rhokana, RST and RCM ending on 30 June. The price indices for copper related to the calendar year ending during the financial year.

values used throughout the previous chapter. In the years before nationalization, between 1960 and 1969, the evidence of a relationship between these variables is far from conclusive; indeed in the case of NCCM there was a strong negative relationship. It is suggested that this is due to particular factors within the company (such as rising costs, falling ore grades or the operation of uneconomic pits) which served to lower the rate of return during the later years of the 1960s in spite of the rising real value of copper prices. In the more recent years since 1971, the relationship between the profitability and real prices is rather stronger although the coefficients of correlation yield values of R of 0.6508 and 0.4765 for NCCM and RCM respectively, indicating that price variation provides an imperfect explanation of changes in mining industry profitability. Other factors are required to explain the financial problems of the industry, which may conveniently be discussed under two broad headings: the volume of production and sales and the costs of production. These are the subject of the next two sections.

6.3 The volume of production and sales

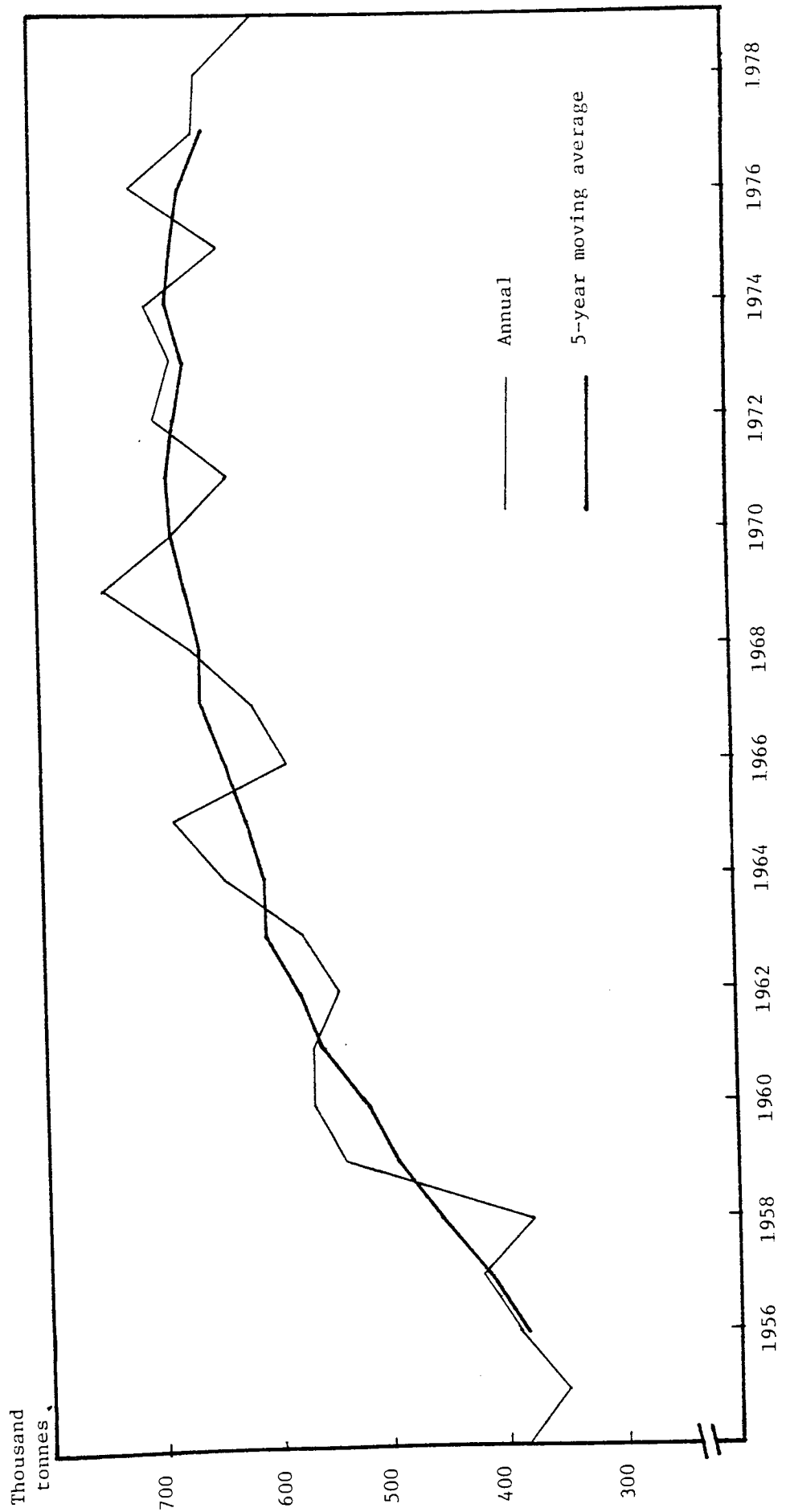
At the time of its independence Zambia was the third largest producer of copper in the form of both ore and the refined metal, accounting for 13.7 per cent of global mine production and 8.5 per cent of refined output, a fact illustrated by the data of Appendix S, Table S.3.2. Its production was surpassed only by the USA and the USSR, and its volume of exports was easily the largest of any country. Zambia's production has declined markedly both in terms of its

relative position among other copper producers and even in absolute levels. By 1970 Chile had caught up with Zambia as a producer of ore, and thereafter increased its volume of production while Zambia's stagnated. By 1979 Chile had increased its production capacity to a level which Zambia had never reached, and had also become the largest international supplier. The figures of Appendix S, Table S.3.2 suggest that Zambian mining output declined very slowly but steadily throughout the period from 1965 to 1979, with an overall fall of 15 per cent in ore production. The apparent increase in refined output is due to the feature noted in Chapter 5 that most less developed producers of copper have invested in refining capacity so that the value added in the country of origin may be maximized. Thus Zambia increased the proportion of its mine output which is refined domestically from 75.1 per cent to 97.0 per cent between 1965 and 1979, the rest being exported in the form of 'blister. In spite of this relative decline, Zambia remained in 1979 the world's fifth largest producer of both ore and refined metal, and the second largest exporter of refined copper; so that it continues to be an important force in world trade, and in the various attempts currently being made to establish commodity stabilization schemes.

The data of Appendix S, Table S.4.5 shows that the decline was rather less smooth than was suggested by Table S.3.2, since there was a substantial degree of instability in the volume of production within Zambia in the years after independence (10). While the degree of instability is less than was found in the case of copper prices, the coefficients reveal that instability combined with slow

growth or decline became something more of a problem during the 1970s than in the previous decade. The three year moving averages of production levels of blister and refined copper combined show that there was a temporary decline during 1966 and 1967, with more permanent decline from 1970. The Mufulira mine disaster of 1970 accounts for at least part of the drop in that year and 1971. However from 1972 onwards there developed a more persistent decline in production interrupted only in 1974 and 1976, both years of relatively high prices when the mining companies may have stepped up capacity utilization to benefit from higher potential revenue. The five year moving average series illustrated together with the original data in Figure 6.1 does not show any permanent change in direction of the trend until 1975 when it becomes apparent that a secular decline commenced. There is no a priori reason for choosing either of these two moving average series, but the greater smoothing achieved by the five year period does distinguish more clearly the long-term trend patterns of production within the Zambian mining industry, and the implication purely in terms of this simple statistical analysis is that the decline shown here may precede a slow decline in the volume of copper production during the 1980s. This conclusion is also reflected in comments privately made by officials within the mining companies, who anticipate no improvement in production unless a sustained increase in prices occurs sufficient to encourage investment both in new projects and in expanding existing capacity. This provides further evidence of the point discussed by Mikesell (1979, p. 128) in Section 5.6 that a price of about US\$1.00

Figure 6.1 Production of copper in Zambia: Annual series and trend, 1954-79



Source: Appendix S, Table S.4.5.

per lb in 1975 values would be necessary to induce new investment in the copper industry.

Since Zambia exports virtually all its mineral production it is to be expected that the volume of exports would be roughly equal to that of production in each year, with small variations caused by company stock management policy and technical factors. The export and production data of Appendix S, Table S.4.5 confirms this as a generalization, and it is found that in only four years did exports vary from production by more than 5 per cent. The first of these four years was 1964, when exports were more than 6 per cent higher than production, probably a result of the higher prices in that year, and the uncertainty felt by the private companies in view of Zambia's becoming independent may have led them to attempt to maximize current profits by running down stocks of finished goods.

The three more recent years were 1978, 1979, and 1980, when exports were respectively 9.6 per cent lower, 7.8 per cent higher, and 8.4 per cent lower than production. This was a direct result of the acute problems of transportation of the country's external trade. During 1978 Zambia had access to only one sea-port, Dar-es-Salaam in Tanzania and severe congestion developed at the port, at intermediate depots and at the minehead. This involuntary accumulation of stocks of finished goods, caused serious problems for the companies' cash flow and profit/loss accounts in 1978, and is one of the principal reasons for their weak performance in the financial year 1978/79. Equally, the rapid decumulation of these stocks

during 1979, meant that the financial position of the companies in that year was artificially improved by higher sales, disguising the substantial fall in the volume of production which occurred. Although the availability of routes is much improved, transportation problems remained, and in 1980 exports were once again substantially less than production. Thus the transportation problem is seen to have been a contributory factor both in the poor performance of the companies in 1978/79 and their rapid (but short-lived) recovery in 1979/80. The supply of imported inputs was also affected by the transportation crisis, and essential spares, equipment and raw materials were often delayed in reaching the mines; consequently, production was adversely affected, and there may have been a more rapid deterioration in the physical condition of the companies' capital stock than would otherwise have occurred.

The discussion thus far has related almost exclusively to the production and market conditions for copper, but both companies have interests in other minerals, though their contribution to total profits was, until recently, almost negligible. Production levels of these metals are shown in Appendix S, Table S.4.5. NCCM is the sole producer of lead and zinc in Zambia, and the importance of each declined with respect to physical output, although their contribution to the gross value of mineral sales remained fairly stable: the combined total value of zinc and lead sales in 1971 was 3.3 per cent, and by 1979 had fallen to about 3.0 per cent (11). There is no published information on the costs of production or net profitability of the production of lead and zinc, but it is likely that their

production was not profitable at least after 1975. An upsurge in lead prices during 1979 may have created a temporarily more favourable revenue outlook, but technical production problems are commonplace at the Broken Hill mine where the metals are extracted and refined, and the operation seems to have been more severely affected than most by the poor supply conditions mentioned above (12).

In remarkable contrast to the limited benefit accruing from the extraction of lead and zinc was the growth of the cobalt sector in the years after 1978. Unlike copper, cobalt is not marketed on open commodity exchanges, but through supply contracts, priced on the basis of producer prices agreed by the main producers. Zaire and Zambia represent the two most important suppliers, representing between them about two-thirds of total non-socialist world demand, though Zambia's share until 1978 was small. In April 1978 civil war broke out in the mineral producing Shaba province of Zaire, seriously disrupting the supply of cobalt. Acute shortage of the metal developed, and in the ten months that followed the price of cobalt was marked up five times from its May 1978 value of \$6.85 per pound to \$25.00 per pound by February 1979, a level which was sustained throughout 1979 and 1980. Thus the increase in the value was of the order of 265 per cent, a rise which could be compared to the OPEC price increase of 1973. However the circumstances were somewhat different: demand proved to be rather more price elastic than was at one time thought, and substitution has occurred in some user industries (13). Also there is no formal producer organisation, though there is a degree of collusion between the Zambian and Zairois

marketing organisations. During 1981 Zaire unilaterally announced a price cut from \$25 to \$20 per pound in the face of a weakening market, and Zambia had no choice but to make a similar reduction (14).

Despite this price reduction cobalt production remains highly profitable, and it is fortuitous that investment in cobalt refining capacity commenced before the 1978 price rises, and were commissioned during 1979, so that both the companies benefitted from simultaneous higher prices and the larger output shown in Appendix S, Table S.4.1; so too did the country's balance of payments as will be seen in the next chapter. For example in 1979/80 the share of RCM's total sales revenue accounted for by cobalt was over 18 per cent, while two years previously it had been only 2.5 per cent, even though the newly commissioned plant was not working at full capacity (15).

6.4 Costs of production

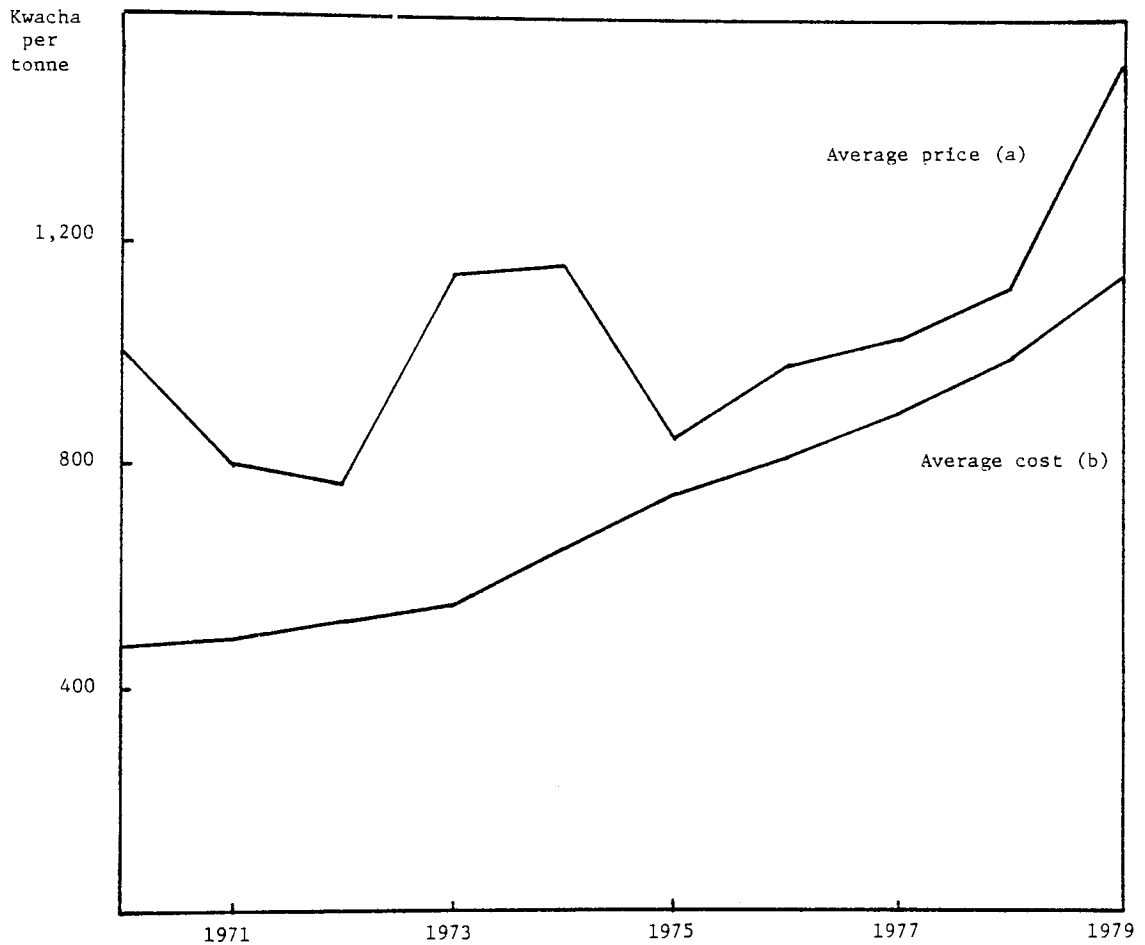
Daniel (1979, Chapter 4) has surveyed various factors relating to the unit costs of production, and going back to the year 1960 he finds that the relationship between realized prices and the unit cost was "satisfactory" to the extent that during the period 1965 to 1970 prices rose considerably faster than costs, so that profits and tax revenue yields rose throughout this period; and finally he notes that it was not until the end of the period which he reviews, that is 1975, that the relationship deteriorated sharply. Thus he notes that even though unit costs were rising they were "sufficiently low for the prosperity of the industry not to be jeopardised by even wide fluctuations in the world price of copper". Daniel also observes

that the companies' gross profits per ton before income tax varied less than the difference between costs of sales and realized prices (if the former are defined to include royalties and export taxes since these related to the value of goods sold). The evidence produced in this section shows that the relationship between unit costs and realized prices deteriorated markedly in the years after Daniel's study and it is also the case that the cessation of liability to tax (because of losses or diminished profits) meant that the companies gross pre-tax profits began to fluctuate as widely as the gap between costs and realized prices.

Reference is made to Figure 6.2. Daniel's study which incorporated the pre-nationalization years, showed that the gap between realized prices and costs was at its maximum in the years 1969 and 1970. Figure 6.2 shows that this gap narrowed in 1971 and 1972, recovered temporarily and was then reduced rather more permanently from 1975 onwards (16). It should be stressed that the unit costs recorded here do not include non-transport marketing costs, nor any form of financial charges, some administrative costs, nor any form of taxation on production or profit, in addition to which, until the adoption of new accounting practices in 1979 and 1980, the provision for depreciation of capital equipment was most inadequate. Although realized prices remained in excess of production costs, a substantial mark-up in excess of production cost is needed in order to cover all expenses before any profit can be recorded.

It is noted in passing that the "realization price" referred to here, and analyzed in Appendix S, Table S.4.6. are the average price

Figure 6.2 Comparison of unit costs and realized price in Zambian copper mining, 1970-79



Sources: (a) Appendix S, Table S.4.6.
 (b) Table 6.6.

Notes: (a) Simple arithmetic average of price realized by RCM and NCCM.
 (b) Simple arithmetic average of costs (free on rail) plus transport costs incurred by RCM and NCCM.

per tonne realized during the year by the Zambian mining companies. It is calculated by dividing total proceeds from the sale of copper by the volume of sales. It is quite possible for this price to differ, in some cases quite significantly, from the average quoted LME price, as shown by a comparison of the "total" realization price and the "unweighted average" (LME) price in Appendix S, Table S.4.6, although a part of the variation may be due to the method of averaging used to calculate the realization prices.

Figure 6.2 indicates a fairly steady increase in the average cost of production during the 1970s with slightly more rapid increase in the later years (17). The costs for each company (See Table 6.6) show a remarkable similarity, with the exception of 1978, which is partly due to changes in accounting practices which have not been removed from the data. A more disaggregated study of the components of the costs of production was also carried out, but is not reproduced in detail here. This again showed broadly similar trends in both companies, although RCM's mining costs rose slightly more quickly than NCCM's, while the latter had experienced a rather more rapid increase in smelting and refining stocks. Apart from this there was little variation in the rates of increase of the four main components into which both companies disaggregate their cost data: mining, concentration, smelting and refining, and general mine expenses or administration. Based on the data of Table 6.6 it is found that mining costs (in nominal terms) rose at an annual average rate of 11.3 per cent, only marginally faster than the general rate

Table 6.6 Costs of production in the Zambian mining industry

	Kwacha per tonne				Index 1971 = 100 (b)	
	Costs (a)		Transport costs	Total	Real cost of production using implicit deflator of:	
	RCM	NCCM				
1970	(412)(c)	(410)(c)	62	(473)(c)	...	...
1971	430	421	65	490	100.0	100.0
1972	456	451	68	521	100.9	102.6
1973	493	465	68	547	100.9	101.3
1974	571	565	79	647	109.7	109.2
1975	649	678	87	750	119.9	115.7
1976	743	720	86	817	116.7	119.7
1977	807	801	88	892	110.0	123.4
1978	838	958	92 (e)	990	107.8	127.7
1979	1060)(d)	1024(d)	97 (e)	1139	112.1(d)	135.0(d)

Sources: Cost of production calculated from NCCM and RCM Annual Reports, 1971 to 1980. Transport costs: Zambia Mining Yearbook, 1977, Copper Industry Service Bureau: Kitwe (Table 11, page 31). Deflator: Zambia non-mineral GDP - Appendix S, Tables S.1.1 and S.1.2. U.S. GNP - International Monetary Fund, International Financial Statistics Yearbook 1980, Washington: International Monetary Fund.

(a) Cost free on rail (f.o.r.) mine station. Converted to calendar year basis using weighted averages of financial year data.

(b) Cost f.o.r. plus transport costs deflated as indicated. Excludes other marketing costs, financial charges and all taxes on production or profits. Covers both companies calculated as simple arithmetic average of companies unit costs.

(c) Relate to incomplete financial year.

(d) Based on new accounting convention.

(e) Estimates, projected on the basis of geometric average growth: 1970-77.

of inflation as measured by the consumer price index for higher income households, which increased at an average rate of 10.8 per cent during the years in question, 1971 to 1979 (18).

This suggests that there has been an increase in real mining costs, but it also raises the question as to which would be the most appropriate deflator to use. One possibility is to use the implicit deflator of non-mining GDP in Zambia to give a comparison with cost increase pertaining to the domestic economy (the implicit deflator of total GDP would be inappropriate because of the bias introduced by the effect of copper prices - see Appendix III.1). Another method would be to deflate by an index which would give some idea of the competitive position of the Zambian mining industry relative to production costs in other countries: an appropriate index would be the implicit deflator of GNP in the United States. Both methods have been applied and are reproduced in the final two columns of Table 6.6. The U.S. deflator suggests that there has been a fairly steady and persistent rise in real production costs over the years 1971 to 1979. The use of the Zambian non-mineral GDP deflator also shows a small rise over the period as a whole, but suggests that costs rose rapidly up to 1975, but were subsequently restrained and reduced annually in real terms until 1978. An unpublished report by the World Bank suggested that "real" mining costs in Zambia rose at an annual average rate of 2.7 per cent between 1970/71 and 1975/76. The rate of increase of the two indices used here is slightly faster than this for the roughly equivalent period 1971 to 1976 (the annual average in both

cases was just over 3 per cent), thus confirming the earlier report's conclusions. The evidence is, however, rather more ambiguous thereafter.

It is clear that there was an increase in costs during the 1970s, and it is instructive to examine some of the reasons why this should have occurred. It is a commonplace observation that productivity in the Zambian mining industry has declined in the post-independence years. That this is true in terms of the usual relatively simple indices of some measure of output divided by the number of employees can hardly be disputed, and the data of Appendix S, Table S.2.4 shows a marked decline in value added for employees in the mining industry. This decline is illustrated by the following selected years (value added expressed as an index (1970 = 100) in constant (1970) prices:

1966	-	120.5
1970	-	100.0
1974	-	91.2
1979	-	85.5

Such a decline may be caused by factors relating either to output or the labour force and it is not true to assert that this trend can necessarily be reversed by actions relating directly to the labour force alone.

Daniel suggests that declining productivity may be due to any one of a number of factors: declining ore grades, losses during the processes which lies between the extraction of ore and the emergence

of refined copper, increased stockpiling of ore and the under-utilization of capacity. There can be little doubt that the grade of ore has consistently declined over the years as shown by Table 6.7. Although there has been a notable fall in the grade of ore which reaches the concentrator, the quality of Zambian ore remains high by international standards (19).

Daniel (1979, pages 87 to 89) produces three interesting indices of output per employee in the Zambian copper mining industry. The first is an index which measures the total final production of refined copper per employee, a standard index of output per worker of the final product of the company. This measure shows considerable instability over the period, but a linear trend line fitted to Daniel's annual observations provided evidence of a declining trend over the period 1964 to 1975, though the coefficient of determination was not particularly high (-0.464), and most of the decline occurred in the years after 1969. The second measure used by Daniel is this same index adjusted by an index of milling grades, an attempt to remove the effects of declining ore grades. Over the same period a linear trend line fitted to the data produced a weakly positive correlation coefficient (0.134), the value for which increased to 0.504 if the final year 1975 is not included; it was in this year that the large decline occurred in the price of copper and it must be treated as an exceptional year. Thus the conclusion of this measure is that the deterioration of ore grades has been an important factor in the loss of productivity over the years.

Table 6.7 Copper ore grades milled, 1965-79

Year	Grade (Percentage copper content)
1965	2.99
1966	2.55
1967	2.79
1968	2.66
1969	2.70
1970	2.67
1971	2.47
1972	2.54
1973	2.53
1974	2.46
1975	2.65
1976	2.52
1977	2.43 (2.52) (a)
1978	... (2.46) (a)
1979	... (2.33) (a)

Sources: 1965-68: Republic of Zambia, Statistical Yearbook, 1969, Lusaka, Central Statistical Office. 1969-77: Mining Yearbooks of Zambia, 1969, 1971, 1973, 1975 and 1977. 1977, 1978 and 1979: Republic of Zambia, Monthly Digest of Statistics, Lusaka, Central Statistical Office, April/September 1980.

(a) Figures in brackets are taken from CSO, Monthly Digest of Statistics.

The third measure which Daniel devised shows total final production per employee adjusted so as to assume constant recovery from a given quantity of ore, that is to remove the effect of losses during concentration and refining. This produces an even stronger positive correlation (1964-74: 0.740; and 1964-75: 0.585). Thus losses due to causes other than declining ore grades - largely processing losses - are seen to have been a very significant cause of declining productivity. Indeed Daniel calculates that such losses rose from about 15 per cent in the period 1960-64 to 25 per cent in 1970-74.

A further feature which emerges from Daniel's calculation (1979, Tables 4.5 and 4.6) is that declining ore grades induced a move towards rather greater capital intensity so that the "real" capital stock (expressed both in toto and per capita) increased throughout the years from 1960 to 1974. Yet, paradoxically, since labour productivity would in these circumstances be expected to increase, it was found that output per worker was falling, as discussed above. One explanation for this feature would be that capital equipment is being used less efficiently - arising perhaps from fewer manshifts per year per unit of capital. A more important reason might be that Daniel's estimates of the capital stock are based on figures prepared from the company annual reports. As has been noted repeatedly the companies have not until 1979 and 1980 made adequate depreciation allowances in their accounts, and simply regarded the cost of replacements as an operating cost. Any estimate of net fixed assets would be based on gross cumulative investment less amounts written off during the year. This would tend to overstate the stock of capital

since no allowance was made for the inevitable deterioration over a number of years in the productivity of capital equipment retained in service, particularly if as seems likely, the actual economic life of equipment was being extended.

The issue of an ageing capital stock leads to the consideration of a number of factors which have adversely affected the mining companies' productive capacity, yet which are not easily quantifiable, although they are frequently identified in analyses of the difficulties facing the companies including their own Annual Reports. An ageing capital stock is characterized by more frequent break-downs, and a greater need for spare parts and maintenance skills. On the first of these the mining companies have had two principal problems: congestion on the principal transport routes (with the consequence of longer delivery time for essential items such as spare parts), and inadequate allocations of foreign exchange. On this latter point the companies, in spite of being the country's chief earners of foreign exchange, are required to compete with all other importers for allocation of foreign exchange, which became an increasingly scarce resource during the latter half of the 1970s. It proved impossible to meet the requirements of the mining companies and so certain maintenance work could not always be carried out sufficiently promptly.

The issue of maintenance skills raises the question of expatriate workers, who still formed over 6 per cent of the total labour force in 1977, although this figure has declined steadily over the years (in 1970 it was about 9 per cent). For a variety of factors not

here (20), a more rapid decline in the expatriate labour force in the mining companies caused the loss of substantial numbers of skilled artisans and workers, who could not be replaced quickly enough under the Zambianisation programme. One of the results was that essential maintenance work was often not performed, or was inadequately done.

6.5 The consequences of state participation

The introduction to this chapter contained a brief discussion of the process leading up to the government's decision to acquire a majority share ownership in the Zambian mining industry. Three years after the initial takeover, that is in 1973, the government decided to redeem the ZIMCO bonds used to compensate the minority shareholders, and to terminate the management contracts thus assuming greater and more direct control over the companies, which until the ZIMCO bonds had matured was to have been heavily circumscribed by the terms of the nationalization agreements with the minority shareholders. In addition to this sequence of events in the early 1970s the development of acute financial problems in both companies led to the accumulation of a large amount of short-term indebtedness to the domestic banking system (principally the Bank of Zambia), which was first taken over by the government and subsequently partially capitalized or converted to equity capital. So in 1978 and 1979 (see Section 6.1) the Government increased its share in the equity of both NCCM and RCM to about 60 per cent. It is of interest to note that although the minority shareholders were unwilling to increase their shareholding equiproportionately (as they were invited to do by

the Government) they were still, in the case of RCM, able to drive an extremely hard bargain for the state's increased participation. Thus shares with a nominal value of K4.00 each were issued to the Government at a cost of K5.40, although the London stock market quotation for RCM shares on the day before the meeting at which the issue was negotiated was only £0.90 or about K1.50 (21). It is apposite to pose the questions whether the takeover was successful in terms of the Zambian Government's objectives, whether in retrospect it was too costly, and whether the companies' production and financial performance would have been any different under 100 per cent private ownership. In order to answer these questions it is necessary firstly to look at the general background to the takeover.

A "mixed" economy, with private and public ownership co-existing, was always an objective of the Zambian Government from the time of independence (22). Thus the partial nationalization of the mining companies must be seen as part of the generalized objective of gaining "control" over the economy, as reflected by three major policy speeches made by the Zambian President - See Kaunda (1968, 1969, and 1970). It was in the second of these that the mining companies were "invited" to give the Government 51 per cent of their shares. In the "Mulungushi Declaration" (Kaunda, 1968) two key areas of dissatisfaction appear to have been, firstly the "virtual lack of mining development since independence" (Kaunda, 1968, page 49) and secondly that the mining companies were distributing too high a proportion of their profits: "instead of reinvestment they have been distributing over 80 per cent of their profits every year as dividends" (Kaunda,

1968, page 50). A related problem was the prevailing tax system which included three different taxes: a royalty, and export tax, and the normal income tax. The first two of these were effectively related to production, with nominal allowance being made for estimated production costs (23). Harvey (1972, page 13) has suggested that the old system was partly to blame for the lack of investment, since it raised the average cost of production, and because it was inequitable between mines in that it would take a larger proportion of the profits of the less profitable mines. Thus, otherwise profitable developments would not be initiated because of the impact of royalties and the export tax on average costs. The tax system was reformed simultaneously with the takeover to the system which still exists: a profit based mineral tax levied on most minerals (at different rates) and the normal income tax on corporate profits. This reform would have made the assessment of the success of the takeover more difficult if production had in fact increased, since it would not have been possible to isolate the effects of Government ownership and a more favourable tax regime.

Thus it would seem that the motivation behind the partial takeover was to gain some degree of "control", to reduce the loss of dividends (a foreign exchange loss), to promote investment in the mining industry and so to raise the level of production above that planned by the companies, thus increasing the level of foreign exchange earnings and inflow to the Government. Bostock and Harvey (1972, pages 152-157) provide documentation of the various Government pronouncements made during the period, showing the importance

which was being placed upon the expansion of production. Prior to the takeover the mining companies had plans for expansion which would have increased production to 793,000 tonnes by 1975 from 748,000 tonnes in 1969 (683,000 tonnes in 1970). Bostock and Harvey note that the Government's own forecasts for production in 1975 were not entirely consistent, with figures ranging from 899,000 tonnes to 967,000 tonnes.

Judged by the criterion of higher production the takeover was wholly unsuccessful as Table 6.8 shows. By 1975 production had not risen since 1970, and by 1979 it had fallen back to less than 90 per cent of its 1970 level. Thus Government participation proved not to be a sufficient condition for expansion, although it could be argued that state involvement remained a necessary condition, and the reason that expansion did not occur was that other conditions were not satisfied: for instance the availability of adequate financial and manpower resources, or the right technical conditions (ore grades, mine depth, etc.). Nevertheless the partial state takeover did not result in a higher volume of production, and to this extent the nationalization exercise must be recognized as having been unsuccessful.

Another important reason noted above for state participation was the desire to reduce the outflow of dividends and the implied loss to Zambia of an investible surplus. This raises the question of the financial costs and benefits which have resulted in the years after 1970, and an attempt was made, summarized in Table 6.9, to quantify the payments made by the Government in the years following

Table 6.8 Production of copper (a) in Zambia, 1965-80

	Thousand tonnes	Index (1970 = 100)
1965	685	100
1966	586	86
1967	616	90
1968	665	97
1969	748	109
1970	683	100
1971	634	93
1972	698	102
1973	681	100
1974	702	103
1975	640	94
1976	713	104
1977	660	97
1978	656	96
1979	604	88
1980	609	89

Source: Appendix S, Table S.4.5.

(a) Copper content of blister and refined copper.

Table 6.9 Financial costs and receipts of state participation in Zambian mining industry, 1970 to 1979 (a)
(In millions of kwacha) (b)

Year	Costs						Revenue		
	(1) Shareholder compensation (c)	(2) Bond redemption (d)	(3) Service costs of Eurodollar loans (e)	(4) Management contract costs (f)	(5) Management contract termination (g)	(6) Capital- ization of short- term loans (h)	(7) Total costs	(8) Government dividend income (i)	(9) Eurodollar loans (j)
1970	14.3	--	--	7.9	--	--	22.2	36.5	--
1971	28.4	--	--	6.3	--	--	34.7	29.6	--
1972	28.4	--	--	7.2	--	--	35.6	34.3	--
1973	12.9	149.8	3.3	11.2	--	--	177.2	56.8	96.5
1974	--	--	14.1	3.7	17.0	--	34.8	12.0	--
1975	--	--	11.6	--	17.8	--	29.4	--	--
1976	--	--	17.0	--	12.6	--	29.6	--	--
1977	--	--	22.4	--	7.5	--	29.9	--	--
1978	--	--	22.3	--	--	--	22.3	2.4	--
1979	--	--	22.6	--	--	97.0	119.6	14.6	--
	84.0	149.8	113.3	36.3	54.9	97.0	535.3	186.2	96.5

Sources: 1, 4: Calculated from information contained in Bostock and Harvey (1972, pages 223-27 and 229-31).
2, 3, 9: Republic of Zambia, Financial Reports, 1973-79, Lusaka: Government Printer (Appendix 5).
5, 6, 8: RCM and MCOM Annual Reports, 1971 to 1980.

- (a) Converted to calendar year basis from financial years by weighted averages.
(b) Converted from dollars where appropriate at average exchange rate for the year in question.
(c) Cost of interest and principal to holders of ZIMCO bonds and loan stock. Estimated from terms and conditions of takeover (see Bostock and Harvey (1972, Appendix A)).
(d) Actual cost incurred by the Government in redeeming ZIMCO bonds.
(e) Service costs relating to Eurodollar loan (see note j).
(f) Estimated annual costs based on formula: 0.75 per cent of turnover, plus 2 per cent of pre-tax profits (see Bostock and Harvey, 1972, Appendix A for details).
(g) Actual costs incurred by companies.
(h) Conversion to equity of government short-term loans.
(i) 1970-78: 51 per cent of total dividends declared; 1979: 60 per cent.
(j) Used to part finance ZIMCO bond redemption (see notes (d) and (e)).

the partial nationalization, and the additional revenue which has accrued as a direct result. No attempt has been made to project cash flows under other scenarios, and the figures shown represent total payments or the authors' best estimates of these payments. The "Actual cost of compensation" was estimated from the terms of the takeover documented in Bostock and Harvey (1972, Appendix A), and this item represents the costs of servicing the 6 per cent ZIMCO bonds 1978 issued in respect of RCM, and the 6 per cent ZIMCO Loan Stock 1982, issued in respect of NCCM (24). The figures shown are the kwacha equivalents of the annual payments which were denominated in U.S. dollars and each figure includes both interest and amortization. These payments continued until the first half of 1973, when the entire issue of bonds and loan stock was prematurely redeemed, recorded in Table 6.9 as the cost of bond redemption. The immediate cost to the Government was partially reduced by the proceeds of the two Eurodollar loans referred to earlier, but the servicing and repayment of these loans must legitimately be regarded as a direct financial cost of nationalization. It should also be noted that although Table 6.9 records transactions only up to 1979 the two Eurodollar loans will not be fully repaid until 1983, so there are some costs which had not been formally recorded at the time of writing. It seems not unreasonable to assume that dividend payments to be received from the mining companies by the Government will to a large extent offset these outflows. Finally the cost of converting the short-term lending to the mining companies into equity must be counted as part of the cost of raising the Government's equity share to about 60 per cent.

It has previously been suggested that one of the principal reasons for the decision to redeem the ZIMCO bonds was the Government's wish to terminate several of the clauses which restricted its freedom of action concerning policy making which would in any way affect the mining industry. Thus the bond and loan stock agreements contained, inter alia, as an event of default "the unlawful cancellation or abrogation by RCM and NCCM of the management and consultancy or sales and marketing contracts" (25). Thus both the existence and termination of the contracts must be seen as a part of the nationalization exercise, and their full costs must be included in any calculation of the costs to Zambia, even though formally the cost was borne by the companies and not by Government, since an outflow of foreign exchange occurred and there was a loss of tax receipts.

The only positive gain which can be quantified is the inflow of dividends to the Government, which in the first four years were indeed substantial, and adequately satisfied one of the underlying principles of the takeover agreements which was that the Government would finance its participation from dividend income. The changes in the system of taxation have been ignored, and it is suggested that some revision of the system would have occurred even if nationalization had not been desired, since as Harvey (1972) notes, there had been considerable criticism of and dissatisfaction with the old system. Any changes in the volume of production must also be disregarded, since the conclusion of the earlier discussion concerning the stagnation and fall of production during the 1970s suggested that some of the underlying reasons were beyond Zambia's control. Bostock and Harvey (1972,

Chapter 7) made estimates of the net benefits which would accrue to the Zambian economy between 1970 and 1975, and the major part of these related to the balance of payments due to the expected increase in the volume of exports. Between 1970 and 1975, an additional K221 million (in 1969 prices) was expected to be added to the country's export earnings, although a small decline was expected in the net revenue of the public sector, defined to include ZIMCO. The latter's receipts were projected to rise to K34 million during the same period, while the Government's revenue would actually fall to K67 million.

Tables 6.9 and 6.10 show the extent to which these expectations have been frustrated. Government dividend receipts have only covered a very small part of the total cost of acquiring a 60 per cent share of the two companies. With the exception of the capitalization of the short-term loans, all the transactions listed in Table 6.9 involved foreign transfers, with each of the payments represented in columns (1) to (5) being direct payments overseas. Government dividend income has been taken to be an indirect saving in the sense that it would have been transferred to foreign shareholders but for Government ownership. This is not strictly accurate since the exchange control regulations operated by the Bank of Zambia since 1968 would have restricted the proportion of profits which could have been transferred abroad (27). Thus the net balance of payments cost given in Table 6.10 is possibly underestimated.

Whichever of the three perspectives represented in Table 6.10 is adopted, it is clear that the decision partially to nationalize has

Table 6.10 Net cost of state participation
in mining by sector, 1970-79

Net cost to:	Million kwacha over whole period
Public sector (a)	252.6
Government (b)	77.4
Balance of payments (c)	155.6

Notes and sources:

(a) Table 6.9, columns 1+2+3+4+5+6-8-9.

(b) Table 6.9, columns 2+3+6-8-9.

(c) Table 6.9, columns 1+2+3+4+5-8-9.

resulted in a substantial financial cost to the Zambian economy. The preceding discussion has made clear that the success of the exercise required a very large increase in production. A further point is that the projections made by Bostock and Harvey (1972) implicitly assumed constant terms of trade and constant production costs when measured in 1969 prices. It is not unreasonable to assume that similar assumptions were made by the Government's economists in formulating the nationalization proposals. This is supported by the assumptions later incorporated in the Second National Development Plan (Republic of Zambia (1977, page 39)) where such assumptions are explicitly stated (28). It would not have been possible to forecast the severe deterioration in the terms of trade which were to occur during the 1970s, nor to have foreseen any of the other operational problems which were to lead to the stagnation and later decline of mine output. On the other hand the Government's production forecasts were unrealistically high, requiring average annual growth rates of almost 7 per cent, and possibly ignoring the long gestation periods which characterize investment in new mining developments. Thus the position is maintained that nationalization may have proved costly in financial terms, but many, though not all, of the factors responsible for this high cost lay outside the control of the Zambian authorities.

6.6 Conclusion

The evidence of this chapter is that the problems of the mining industry in Zambia may be directly attributed only in part to the deterioration in the real value and the instability of copper prices.

Real unit costs of production in the Zambian mining industry rose during the 1970s, and this increase was substantial vis-à-vis costs in the rest of the world. However the argument has also been put forward that the reasons for the increase in unit costs were largely beyond the control of the companies. A further problem was the decline in Zambia's mineral output not only when measured relative to other producers, but even in absolute terms. This decline in production may be explained as an indirect effect of the fall in the international purchasing power of copper. The fall in the real value of Zambia's exports reduced its capacity to import essential inputs and this in turn reduced production capacity in the mines, as in other industries. Thus a vicious circle was established from which Zambia found itself unable to escape. The situation was exacerbated in the years from 1975 by the critical problems of external freight transportation, caused by the closure of some routes and congestion on others. Finally the difficulty of retaining foreign workers with the necessary technical skills compounded the problems of maintaining production at full capacity and efficiency.

The Zambian mining industry encountered extraordinary circumstances in the years after nationalization in 1970. Since most of these lay beyond the control or influence of national authorities, their existence invalidates any attempt to use the Zambian experience in any more generalized study of the case for or against indigenous ownership in the extractive industries.

Notes

1. In a dramatic and often quoted incident the President of Chartered Company (which had taken over the BSA Company) was obliged to accept an offer of £4 million (shared equally by the British and Zambian Governments) as settlement for the transfer of the mineral rights which had been in dispute in the pre-independence negotiations. The legal position was far from clear and Zambian ministers plainly felt that any payment to the company was generous. The offer was agreed on 23 October 1964, the day before Independence.

2. The companies involved were De Beers Consolidated Mines, Rand Selection Company, Anglo-American Corporation (AAC) of South Africa, Chartered Consolidated, Selection Trust and AMAX. This interconnection is demonstrated by some of the holdings of the various companies. For instance De Beers owned 5 per cent of AAC, which held 10 per cent of De Beers and 18 per cent of Rand Selection. Chartered Consolidated had shareholdings in Rand Selection, AAC and Selection Trust, with the latter holding shares in AMAX. Thus all were inter-connected to some extent. For further details see Bostock and Harvey (1972).

3. A fairly strong relationship was found to exist between "real" copper prices and the rate of return on assets during the 1970s. See Table 6.5, and the associated discussion.

4. A widely accepted notion of solvency is a current assets ratio (current assets divided by current liabilities) greater than 1.0.

5. See Bank of Zambia, Report and Statement of Accounts, 1978 (page 32) for further details of the composition of this amount.

6. This arrangement was initiated at the instigation of the IMF. No source of information can be cited in this instance, other than the author's involvement. The loans are now reflected in the Government, Bank of Zambia and company accounts in the normal way.

7. The figures for RCM require slightly more elaboration, since it would appear from the data that the short-term indebtedness was not a serious problem. During the financial year 1977/78 substantial borrowing was undertaken, so that by 1 April 1978, the Government was to take over K112.2 million of RCM borrowing which was treated by the company as medium- or long-term debt: hence the increase in long-term debt in 1977/78.

8. That the increase in interest charges was not larger results from the predominance of domestic currency borrowing; Zambian interest rates rose considerably less than international rates. The IMF's International Financial Statistics Yearbook, 1980 shows that Central Bank discount rates between 1971 and 1979 rose from 4.5 to 12.0 per cent in the United States; in Zambia the rate rose from 5.0 to 6.5 per cent in the same period (see Bank of Zambia, Quarterly Financial and Statistical Review, September 1980, Table 1 (xx)).

9. The company annual reports do not allow any systematic quantification of their foreign indebtedness. However the Republic of Zambia Financial Report 1979 (Appendix I, pp. 506-8) shows that at 31 December 1979 guarantees on external loans were outstanding to the extent of K146.1 million and K70.0 million in respect of NCCM and RCM respectively. It should however be noted that this is a contingent liability relating to total interest and principal payments, so that, depending on interest rates and amortization periods, only a fraction of these amounts is the principal outstanding. In addition there will be extensive credits (e.g., suppliers' credits) which are not guaranteed by the Government.

10. Instability coefficients were calculated (see Chapter 4) for the periods 1960-69 and 1970-79 as follows: I (instability only) 0.0591 and 0.0457 respectively; and IG (instability and growth) 0.0466 and 0.0485.

11. See Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office, April/September 1980, Table 18 (b) for details.

12. For instance see NCCM Annual Report 1978, page 10, for problems occurring in that financial year.

13. See NCCM Annual Report 1979, page 15.

14. See The Economist, March 21, 1981, page 83, "Zambia's copper woes hit cobalt too".

15. See RCM Annual Report 1980, page 1.

16. It proved impossible to reproduce Daniel's unit cost figures (see Daniel (1979), Table 4.4, page 85) so these figures are not directly comparable with his.

17. This effect is reflected in the coefficient of determination, R^2 , of 0.9882 for an exponential trend line being slightly higher than the value for a linear trend line of 0.9679.

18. The figures quoted are geometric averages. The consumer price index was calculated from Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office, April/September 1980, Table 48, page 44.

19. See Appendix V.1 for details relating to global variations in types of ore.

20. Amongst the reasons were a perceived deterioration in living conditions in Zambia (not to be confused with levels of remuneration) and a worsening security situation. An increasing number of expatriates worked for the minimum period of their contractual obligation.

21. See RCM Annual Report 1979 (page 20, Note 19, to the Accounts and Financial Times, 7 July 1979).
22. For an account of the general shift towards state participation during these years see Martin (1975) and Pettman (1974).
23. A full description of the old tax system and the reforms which were introduced are described by Harvey (1972).
24. It proved impossible to verify the exact method of redemption of the bonds and loan stock. Bostock and Harvey (1972, page 226) report equal semi-annual installments (i.e., annuity method) while figures in the Ministry of Finance Financial Report 1973, Appendix I suggests an equal payment of principal. The former annuity method has been assumed.
25. For full details of these and other conditions see Bostock and Harvey (1972, pages 227-8).
26. See Bostock and Harvey (1972, Tables 7.1 to 7.10) for full details of their projections.
27. See Bank of Zambia, Annual Report and Statement of Accounts, 1968, page 34, for details of these regulations.
28. An adjustment was made to the Plan's forecasts to allow for a price lower than the exceptionally high prices of 1969 - see Republic of Zambia, Second National Development Plan (1972, footnote 4, Table I-1, page 40).

CHAPTER 7 EXPORT INSTABILITY AND THE BALANCE OF PAYMENTS

7.1 Introduction

While instability in export earnings is of considerable concern to a large number of developing countries, the growth of the deficits of the current account of the balance of payments in these countries has been the cause of even more widespread attention, particularly in the years since 1973 (1). Export instability may be identified as a separate problem from the chronic current account deficits which characterize some developing countries, but the former may well exacerbate the difficulties in economic management caused by the latter. In particular it will be observed from the empirical evidence discussed in this chapter that this is especially true of the Zambian economy.

This chapter commences with a brief review of the importance of the balance of payments from a theoretical stand-point; and then turns to international comparative studies of export instability in a sample of countries and a global summary of balance of payments aggregates, concluding with a more detailed examination of the Zambian external accounts since 1965.

7.2 The balance of payments in an open developing country

In Chapter 1 (section 1.4) and Appendix I.2 a simple dual-gap model was introduced which showed the relationship between the "balance of payments" (2) and the relative levels of domestic savings and investment. This is now expanded slightly as follows:

$$Y = C + G + I + X - M + P_f \quad (7.1)$$

$$Y = Y_d + T \quad (7.2)$$

$$S_p = Y_d - C \quad (7.3)$$

$$S_g = T - G \quad (7.4)$$

where Y is total value added (gross national product)

Y_d is total disposable income in the private sector

C is the consumption of the non-government sector

G is the consumption of the government sector

I is total investment (gross)

X is exports

M is imports

P_f is net property income from abroad

T is the total receipts by the government sector from taxation, etc.

S_p and S_g represent the saving of the non-government (private) and government sectors

The introduction of P_f follows the approach of Salop and Spittaller (1980). Re-arrangement of equations (7.1) to (7.4) yield the following relationship:

$$(Y_d - C) + (T - G) - I = X - M + P_f$$

that is $S_p + S_g - I = X - M + P_f \quad (7.5)$

Thus it will be seen that a deficit on the current account occurs if gross domestic investment exceeds aggregate domestic savings. Equation (7.5) also shows clearly that an increase in a deficit on the government's current account will result in a larger

deficit on the balance of payments unless private sector savings increase by an equal amount, or unless investment is reduced. Alternatively action could be taken on one of the constituent variables of the balance of payments, that is on the right hand side of equation (7.5). The point is simply that there exists a direct relationship between the government's current account and the balance of payments.

It was noted in Chapter 1 (section 1.3) that one of the "stylized facts" of developing countries is a low level of domestic savings. Empirical studies had found that the savings-investment gap was frequently dominant in the early stages of development, but that subsequently the export-import (or foreign exchange) gap, which may be interpreted as the current account of the balance of payments, became the more serious constraint. It is therefore reasonable to conclude that a current account deficit is a frequent, if not inevitable, concomitant of economic growth in an open, developing country. It is also not difficult to see that it is valid to regard a balance of payments deficit on current account as a form of imported savings, since the excess of domestic investment over domestic saving is financed by higher imports than exports.

The above discussion is partially supported by the work of Salop and Spittaller (1980) who, in the context of international trade between developed countries, show that there exists an optimal and sustainable long-run equilibrium position on the current account, but imply that it exists only with respect to optimal savings behaviour

within the country and international flows of investment. The optimal current account for these countries may be either a surplus or deficit on current account, but the conclusion is qualified by saying that the optimal conditions relate to the sum total of the current account balance and the level of domestic investment, thus effectively relating equation (7.5).

The similarity of analysis between developed and developing countries is superficial and limited, so that any economic modelling of the latter can be based upon the former only in very special cases. An example of the difference between the two groups of countries is in the treatment of imports. The standard treatment in economics textbooks as in most modelling exercises regards imports as some function of national income. In the simple national accounting model outlined above if imports were to be introduced as an endogenous variable then a standard approach would be to describe imports as a linear function of national income:

$$M = m_0 + m_1 Y$$

where m_1 is the marginal propensity to import. Even in variants of the alternative "monetary" explanations of the balance of payments similar propositions may be found (3). Thus it is assumed that imports are determined simply by output and the preference of economic agents for imports, ignoring completely the ability of the economy to finance a given volume of imports. This gives rise to an alternative concept which will be referred to as the capacity to import. Value added may be significant in determining import capacity, but it is suggested that this will be considerably less important

than factors such as export values, the size of the country's foreign reserves and expected net long-term foreign capital. Later in this chapter a comparison will be made between an assessment of Zambia's capacity to import and the actual level of imports in the years since 1969. At this stage it is sufficient to note that the concept of the capacity to import represents a more realistic hypothesis than the propensity to import in developing countries, such as Zambia, where foreign financial resources have become a serious constraint.

Differences in fundamental characteristics between developed and developing countries also mean that policies directed at stabilizing an individual country's balance of payments must be chosen with regard to that country's particular circumstances, a point well argued by Crockett (1981). For instance he suggests that lower substitutability in developing countries between exported, imported and domestically traded goods means that policies designed to restrain domestic demand are not likely to release exportable output.

This is certainly true in Zambia since the country's major export comes from the mineral "enclave" which can remain largely untouched by the authorities' demand management policies. Crockett also suggests that many developing countries satisfy "small country conditions" which would include an inability to influence world prices for their imports and exports. Thus devaluation will not alter the price paid on the international markets for copper, and the only effect will be on the domestic currency profitability of the copper producer. These characteristics, taken together with some of the stylized facts of developing

countries discussed in Chapter 1 (section 1.3) provide the basis for strong reservations about the efficacy of many of the traditional policy prescriptions for external stabilization policies. Notwithstanding these reservations the following sub-paragraphs summarize the major policy options which are open to developing countries in trying to manage their external financial positions:

7.2.1 Exchange rate manipulation. Policies here may range from the maintenance of multiple exchange rate regimes, in which differential rates are established to discourage or encourage particular transactions (e.g., different rates for tourists, commercial transactions and for residents' external remittances) to the maintenance of a system of floating exchange rates such as now exists in the case of the pound sterling or the U.S. dollar. The European Monetary System maintains a system of controlled floating in which participating countries voluntarily accept limits within which their currencies may fluctuate with respect to some agreed central value. Such systems of floating exchange rates may only function where there exist foreign currency markets in which the currency in question may be traded against a significant number of other currencies. Therefore it is not possible for most developing countries to operate true floating rate regimes for their currencies even if they should wish to do so, because of the rudimentary nature of their monetary and capital markets, and the fact that their currencies are not convertible internationally. Nevertheless a growing number of developing countries have ceased to peg their currencies to those of particular convertible currencies, preferring

instead some form of currency "basket": a common form is the adoption of a direct link to the IMF's Special Drawing Rights (SDR) currently composed of a weighted basket of five currencies (4), although a large number of countries have established their own baskets, more accurately to reflect the composition of their international transactions. Table 7.1 shows the exchange arrangements adopted by IMF members in 1978 and 1981.

The method of exchange rate determination may be chosen from among various options: the maintenance of a fixed rate against the reference currency, depreciations or devaluation in the case of a severe balance of payments disequilibrium (5), or the use of what has come to be called the "crawling peg". In this last case an initial value is determined against the reference currency, and then the exchange rate is altered periodically according to a set of indicators, usually related to domestic economic performance. A description of the latter system may be found in Krueger (1981) and it is understood to be increasingly favoured by the IMF in its country "stabilization" programmes. A related concept is the IMF's Multilateral Exchange Rate Model (MERM), which has been developed as a general case with a specific application to the major copper exporting countries described by Feltenstein, Goldstein and Schadler (1979). Its basic concept is to develop a system in which the exchange rates of developing countries with certain characteristics in common could be determined simultaneously. Thus it could be applied to the developing countries which are important exporters of copper - Chile, Peru, Zaire and Zambia.

Table 7.1 Exchange arrangements among IMF members: 1978 and 1981

	<u>Third quarter 1978</u>		<u>July 1981</u>	
	Number	Percentage	Number	Percentage
1. Currency pegged to:				
U.S. dollar	41	30.8	38	27.1
French franc	14	10.5	14	10.0
Pound sterling	5	3.8	1	0.7
Other currency	4	3.0	3	2.1
Special drawing rights	13	9.8	14	7.0
Other currency composite (a)	18	13.5	22	15.7
2. Co-operative arrangement (b)	6	4.5	8	5.7
3. Adjustment according to a set of indicators (c)	5	3.8	4	2.9
4. Other (d)	<u>27</u>	20.3	<u>36</u>	25.7
Total	133		140	

Source: International Monetary Fund, International Financial Statistics, page 11, September 1981, Washington: International Monetary Fund.

- (a) A "basket" of currencies determined by country in question.
 (b) Indicators determined by member.
 (c) Includes all other arrangements, including "floating" currencies.

7.2.2 Fiscal measures. As both Todaro (1977) and Killick (1981a) among others have noted, in many instances governments or monetary authorities are reluctant to accept the domestic inflationary consequences of straightforward currency devaluation, and it is frequently the case that no appreciable effect on exports is achieved. In such cases the authorities are able to impose other measures which would raise the domestic prices of imported goods and other foreign transactions: for instance, higher import duties, taxes on foreign remittances such as corporate profits, or high administrative charges on any purchase of foreign currency; alternatively in appropriate cases the government could offer subsidies on certain selected exports. Such measures have the disadvantage of imposing greater administrative burdens on the authorities, but an argument in favour may also be advanced. It has already been implied that the impact of exchange rate devaluation in a small economy is not symmetric with respect to imports and exports: that is imports may be discouraged by means of the price mechanism, but there may not be an equivalent effect on exports if the majority of the country's foreign currency earnings is derived from a primary commodity whose price is determined on international exchanges. It is however true that the profitability of the commodity producer will be increased in terms of domestic currency (provided that the producer is a net exporter), or expressed alternatively devaluation results in a redistribution of income in favour of the export sector and away from the rest of the economy, which will include those industries which are net importers but which may also be at the

heart of a country's industrialization programme. In this sense devaluation can be counter-productive while fiscal measures allow a greater degree of selectivity as Killick (1981, p. 214) has noted, with the government able to select those industries which should receive discriminatory attention.

7.2.3 Exchange and import controls. A similar argument may be adduced in favour of direct non-market controls over the allocation of foreign currency to potential importers. Exchange controls generally take the form of limitations on the foreign currency allocated for each transaction by individuals or institutions. In addition it is likely to be a feature of the system that all residents will be required to surrender all or most of their foreign currency assets to the authorities (6). Exchange controls can apply to any external transaction, visible or invisible, and regardless of whether it is attributable to the current or the capital account. A special case of exchange control is the common system of import controls, in which administrative machinery is established to control the volume of certain types of goods, often with strict physical quotas being imposed on imports during given time periods, and in some cases it may be decided to impose outright bans on the import of certain (usually luxury) goods.

7.2.4 Involuntary credit. The preceding measures have been described as means by which countries may try to restore their external balances when they have exhausted direct financial measures such as increased foreign borrowing and reserve depletion. In a

number of cases countries which have been reluctant to take the necessary measures or whose external position has deteriorated so fast that corrective measures could not be taken sufficiently quickly have effectively resorted to calling on "involuntary credit"; in other words they have been unable to make external payments when due and have accumulated arrears of external payments. Data on this problem is understandably not easily available, but it would appear that during the 1970s at least thirty-two developing countries accumulated such payments arrears (7). That the problem is growing worse quite rapidly is shown by the IMF's estimate that by the end of 1979 outstanding arrears amounted to SDR 5 billion, seven times the total at the end of 1975 (IMF, May 1981). It should be noted that the arrears in question relate almost exclusively to commercial payments for goods and services; the problem of default on debt service costs has not always occurred in these same countries, and it is often the case that commercial banks tend to forestall such cases of default by refinancing programmes rather than allowing actual default to occur. This is not the case with commercial supply contracts which would generally carry penal rates of interest over and above the basic rates for the normal suppliers' credit.

7.2.5 Conclusion. The International Monetary Fund's articles of Agreement state that,

"No member shall, without the approval of the Fund, impose restrictions on the making of payments and transfers for current international transactions" (IMF, Article of Agreement, Article VIII).

In practice the majority of IMF members and virtually all developing countries practice exchange restrictions, frequently very extensive

in coverage. The annual publication by the Fund of a Report on Exchange Arrangements and Exchange Restrictions is witness to this fact. With the exception of the use of multiple exchange rates, Zambia has used all of the direct and indirect methods of correcting its external position, including: devaluation, pegging its currency to a basket of currencies (the SDR), exchange and import controls, fiscal measures and even the accumulation of substantial external payments arrears. The next sections will provide a detailed account of the process which led to this latter situation from an initial position in which foreign reserves were approximately equal to one year's imports.

Finally the question must be examined as to whether there is a single figure which best represents a suitable summary measure of the "balance of payments". The balance of (merchandise) trade measures simply the surplus or deficit on trade in goods only, excluding payments for services (i.e., the "invisible account"). Moreover the measure is not unambiguous, since some presentations value imports on a c.i.f. basis while others use the f.o.b. valuation (8) causing considerable variations in the level of the trade balance. Killick (1981a) favours the use of the "basic balance", which is defined to include all current account transactions plus all long-term capital flows. His rationale for this appears to be that most developing countries can rely on a certain net inflow in each year. In the author's opinion this is not a valid assumption; it is sufficient only to look at the experience of Zambia as displayed in Appendix S, Table S.6.1 to recognize that there may be very

substantial variations in net flows from one year to another and casual observation would suggest that the long-term capital account has been one of the most unstable elements of Zambia's balance of payments. While it may be more valid an assumption for large countries like Brazil or Mexico, this is probably mainly due to the relatively large numbers of private investors in these countries, and to their perception of the existence of favourable investment conditions. The loss of confidence by foreign investors can lead not only to a diminution of capital inflow but to the actual withdrawal by foreign investors.

For the same reason it is felt to be undesirable to use the "overall balance" which includes all current and capital transactions including short-term capital flows, but excluding monetary movements and reserve depletion. For these reasons the current account is adopted in this study as the best indicator of a country's external financial position since it provides an indication of a country's foreign purchasing power without recourse to foreign debt or investment. It should, however, be noted that even the current account does not fully satisfy this condition since it includes the item "unrequited transfers" consisting mainly of intergovernmental grants and the remittances of foreign or expatriate workers. In the case of the former, at least, no guarantee exists of a steady flow from year to year.

7.3 Instability of export earnings

It was clearly established in Chapter 5 that copper was one of the most unstable of primary commodities with respect to its price behaviour over the period from 1960 to 1979, when account was also taken of the change in its "real" purchasing power. Furthermore the evidence of Chapter 6 was that at the same time as the "terms of trade" for copper were declining the Zambian mining industry was experiencing severe production problems. Taken together with the fact that Zambia relied for over 90 per cent of its export earnings on copper, these factors provide ground for expecting that the instability of export earnings may have been a more serious problem for Zambia than for many other developing countries. The evidence of this section provides considerable support for this contention.

In order to obtain a representative cross-section of countries, a simple random sample was taken of countries for which data appear in the IMF's International Financial Statistics (9). The total sample size was 44 including 39 chosen by simple random selection and five major developing exporters of copper: Chile, Peru, Papua New Guinea, Zaire, and Zambia. Due to the limitations of data it was possible to use data for the period 1964-78 only rather than the slightly longer period used in the study of commodity prices, but the general conclusions for the first and second periods may be taken as corresponding in both cases. Two analyses were attempted: first in terms of domestic currency values of exports, and second on the U.S. dollar values of annual reports converted from domestic currency values where

appropriate by the average rate of exchange for the year in question. The domestic currency analysis is not presented here for two reasons: firstly, domestic currency export values were not available for all countries; and secondly, the use of a common convertible currency unit removes the distorting effect of an unstable exchange rate, since the reasons for currency fluctuations may, for instance, lie in a domestic inflation, which would be peripheral to the study of export instability. For example, during the period under review the Peruvian sole depreciated by 86 per cent against the U.S. dollar: the index IG consequently registered a value of 38.2 on domestic currency exports but only 13.1 on exports measured in U.S. dollars. It was felt to be desirable to remove the effect of differential rates of currency depreciation (and in a few cases appreciation).

The analysis throughout was conducted on the "real" value of exports as measured by deflating the current value by the index of world export unit values published in the IMF's International Financial Statistics, and used in previous chapters. It is also noted that the sample was designed to give an equal probability of inclusion to any country whether it was developed or developing. The fact that only four developed countries appear is due only to statistical chance.

The full results are presented in Appendix S Table S.5.1 which divides the period 1964-78 into two equal parts, and three statistics for each of the 44 countries were calculated: the average annual (exponential trend) rate of growth, G, a simple index of instability,

I, and the composite growth and instability index, IG (10). Table 7.2 presents the index IG for the 10 countries which showed the highest instability in the period 1964-78, and the ten with the most stable export earnings in the same period, ranked according to the index values for this whole period.

The most stable countries are the industrial economies which have diversified manufactured exports with relatively stable prices, oil producers which have experienced very rapid export growth, or relatively high income developing countries with a rather more diversified export base than most developing countries. The ten countries with the highest degree of instability are low income developing countries: median per capita GNP in 1978 for this group was US\$1,520 for the other group (11). The exception to this is Chile, but this country is a member of another group of countries - the copper producers. It is interesting to note that of the seven most unstable countries in the sample four of these were the major copper exporting nations: Chile, Peru, Zaire, and Zambia. It is suggested that the only reason that Papua New Guinea does not appear in this list is its late entry onto the world copper markets (12); a ranking prepared on the basis of IG for 1971-78 showed that it was seventh of the 44 countries. Thus the conclusion of Chapter 5 that copper was the most unstable of all commodity prices in the period from 1960 to 1979 is reflected in a very high degree of instability in the total export earnings of the principal producers of copper.

A number of other features of the export performance of the countries under review are noted at this point without great elaboration.

Table 7.2 Extremes of export instability, 1964-78 (a)

	1964-78	1964-71	1971-78
Ten most unstable countries (b)			
1. Zambia	59.3	18.9	43.7
2. Sierra Leone	36.5	11.8	30.5
3. Zaire	29.2	4.7	29.4
4. Central African Republic	17.0	9.6	15.4
5. Peru	16.3	5.4	12.5
6. Yemen Arab Republic	16.1	9.4	36.2
7. Chile	15.4	6.3	15.3
8. Tanzania	15.0	5.9	16.3
9. Sri Lanka	14.9	4.7	8.5
10. Senegal	13.9	10.0	10.7
Ten most stable countries (b)			
9 = Ecuador	4.0	6.9	7.9
9 = Tunisia	4.0	2.9	9.3
8. Ivory Coast	3.6	5.9	4.0
7. United Kingdom	3.4	2.3	5.8
6. Indonesia	2.7	7.1	5.1
5. Nigeria	2.6	9.5	9.1
4. Iran	2.5	4.1	10.1
3. Japan	2.3	1.1	3.0
1 = Greece	2.1	3.4	4.9
1 = Singapore	2.1	2.5	4.4

Source: Appendix S, Table S.5.1.

(a) Among the 44 countries sampled - see text.

(b) As measured by IG the composite growth and instability index ranked according to values for the whole period, 1964-78, and described in Chapter 4.

Firstly, instability of export earnings increased during the 1970s whatever measure is used (13). Secondly, there was a remarkable variation in the annual average growth rates of exports among countries during the entire period, ranging from -4.8 per cent to 18.3 per cent (15.3 per cent if oil exporters are excluded). Thirdly, growth rates of export earnings declined during the 1970s from an average of 5.2 per cent in 1964-71 to 4.3 per cent in 1971-78, and if oil exporting countries are excluded the fall is much larger - from 4.6 per cent to 2.4 per cent (14). It has frequently been suggested that one of the main reasons for instability in export earnings is the degree of export concentration and this proposition is explored in limited detail below. It is also suggested that high instability may be related to poor or erratic growth performance. Certainly one of the reasons for the increasing value of the IG index may be deterioration in the terms of trade for the developing countries. These three points will be explored in the next section.

The most striking feature of Table 7.2, in the context of the present study is the extent to which the instability of Zambia's export earnings exceeds that of other countries in the sample. Thus, for instance, the index IG for Zambia during the period 1964-78 was over 60 per cent higher than that for second ranking Sierra Leone. The evidence of earlier chapters was that Zambia had been affected not only by relying on the export of the commodity with the most unstable price, but also that the physical volume of copper exported had declined, particularly in recent years. Table 7.3 confirms this insofar as instability existed in both the volume and unit value

Table 7.3 Instability of copper exports in Zambia: 1964-78 (a)

		Simple index of instabi- lity (I)	Index of instability and growth (IG)	Trend growth rate
Value	1964-71	19.3	21.8	-1.7
	1971-78	23.4	56.9	-11.9
	1964-78	26.8	76.6	-7.2
Volume	1964-71	6.5	6.4	0.2
	1971-78	6.5	6.8	-0.6
	1964-78	6.7	6.6	0.1
Unit value	1964-71	15.2	17.4	-1.9
	1971-78	21.7	50.6	-11.3
	1964-78	23.6	68.3	-7.3

Sources: Calculated from Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office, April/September 1980 (Tables 24 and 27), and Bank of Zambia, Quarterly Statistical Review, September 1976 and September 1980, Lusaka, Bank of Zambia (Table 4iii for 1964-77).

(a) Based on "real" values: nominal values deflated by the Zambian index of import unit values, with all monetary aggregates expressed in kwacha.

(b) Indices described fully in Chapter 4.

indices although it is clear that by far the larger part of the instability in total value was attributable to variations in the unit value index (15).

It is, therefore, suggested that one of the reasons for Zambia's poor growth record is the instability of its export earnings, and the deterioration in its terms of trade; and that the instability is related to its concentration on copper exports. The next section will explore the extent to which some of these economic variables are linked in the random sample of countries previously selected.

7.4 Economic growth, export instability, and concentration

The idea that poor economic growth is at least partially a result of a high degree of instability in export earnings is one which does not appear to have a well established theoretical pedigree, but is nevertheless presumed to underlie institutional attempts to stabilize commodity prices or earnings. It is easier to postulate a negative correlation between economic growth and the composite instability and growth index which has been developed, since export growth, reflected in the index, would have a direct effect on the growth of GDP. Moreover, it is probably true that the objective of most commodity agreements is not simply to prevent fluctuations in prices, but also to prevent their secular decline or to attempt to raise prices above their normal market level as McNicol (1978, pages 30-39) has suggested.

Using the sample of 44 countries selected in the previous section an attempt was made to establish a statistical relationship between

the rate of growth of gross domestic product and one or more of the following export-related variables: the simple instability index, I, the growth and instability index, IG, and the rate of growth of export earnings. The results are presented in Table 7.4. The coefficients of determination (R^2) are low in some instances, but the nature of the relationships are broadly in line with a priori expectations: that there exists a negative relationship between economic growth and the value of the indices, which is somewhat stronger in the case of IG. However the fact that the coefficients of determination are increased markedly by the introduction of the growth rate of exports suggests that the major part of the variation in the growth rates of GDP is attributable to differences in the overall growth performance of exports rather than to mere instability of export earnings (16). This very simple analysis does not provide convincing evidence of a strong linkage between economic growth and export instability. However, if trend growth of exports is incorporated then a statistically significant relationship is established; or stated alternatively, the composite index IG provides a more powerful explanatory variable than a more traditional measure of instability.

A further relationship involving the index IG which requires investigation is the extent to which it is influenced by the degree of export concentration. As MacBean and Nguyen (1980) have noted, until the 1960s the conventionally accepted presumption was that concentration was a major cause of instability, a view which was to be challenged by studies such as Coppock (1962), Michaely (1962), Massell (1964), MacBean (1966), O'Brien (1972), and Soutar (1977).

Table 7.4 Relationship between growth of GDP and export performance (a): 33 countries(b)

Dependent variable: trend growth of GNP in	Independent variables			R ²
	Constant	Index of instability	Index of instability and growth		Trend growth rate of exports
Regression coefficients (c)				
<u>1964-71</u>	7.45 (0.92)	-0.184 (0.107)		0.0874
	8.45 (0.86)		-0.444 (0.141)	0.2417
	6.46 (0.86)	-0.250 (0.096)		0.0296 (0.0091)
	7.16 (1.06)		-0.511 (0.014)	0.179 (0.092)
<u>1971-78</u>	3.22 (1.1416)	0.110 (0.074)		0.0661
	6.59 (0.771)		-0.156 (0.053)	0.2180
	3.67 (0.82)	-0.0054 (0.056)		2.75 (0.049)
	3.36 (0.914)		0.0243 (0.056)	0.291 (0.062)

Sources: Calculated from GNP growth rate data in United Nations Yearbook of National Accounts Statistics, 1975 (for 1964-71, Table 4A) and 1979 (for 1971-78, Table 6A); and instability indices and export growth rates in Appendix S, Table S.5.1.

(a) As measured by growth and by instability.

(b) Those countries for which GNP data was available for both periods 1964-71 and 1971-78; countries excluded were: Algeria, Egypt, Ivory Coast, Kuwait, Libya, Malaysia, New Zealand, Senegal, Swaziland, Togo, Yemen Arab Republic.

(c) Based on simple linear model; figures in brackets are standard errors of these coefficients.

MacBean and Nguyen (1980, p. 354) suggest that two reasons for the apparent weakness of the relationship are that export earnings from individual commodities can move in phase with the result that weakness in one is cancelled by strength in another; and, secondly that countries with high concentration tend to specialize in the production of relatively stable commodities. They then demonstrate that the weakness of the relationship between instability and concentration may be due to the wide dispersion of the degree of instability among commodities, a feature which the evidence of Appendix S, Table S.5.1 supports. This argument is given greater generality in a note by Turner and Lambert (1981) and accepted in a rejoinder by MacBean and Nguyen (1981). The mathematical analysis of these papers depends heavily on the exact definition of instability used and the means by which it is measured, and in the MacBean/Nguyen study the index used is essentially a weighted composite of the instability indices of each commodity exported. While this does not challenge the validity of the argument considerable difficulties would be encountered in empirical tests, due to the large amount of data which would be needed.

A simple investigation was conducted, using the indices I and IG, testing for correlation with three measures related to the degree of export concentration, each defined in the footnotes to Table 7.5. These three latter indices are all taken from the UNCTAD Handbook of International Trade and Development Statistics. Thus one potential source of error in the investigation is that the data have been obtained from different sources. In addition the measures relating to

concentration refer to single years only, each roughly corresponding to the mid-points of the period under investigation, so that concentration in the period 1964-71 is estimated by indices for 1968, while the 1976 indices are applied to the period 1971-78. However this is not thought to be a serious problem since the structure of any economic activity is generally slow to change.

The index of commodity concentration provides an indication of the extent to which a country's exports are concentrated with reference only to its own export "basket". In contrast the index of diversification is based upon the extent to which a country's export pattern differs from the structure of total world trade thus providing an alternative measure to the index of concentration. The results, summarized in Table 7.5, suggest a significant, although not extremely strong, relationship between the degree of instability and both the indices of concentration and diversification, with confirmation provided by the negative correlation coefficients in the case of the number of commodities exported. The presence of major oil producing countries is a distorting factor in that these countries have very high degrees of export concentration and (particularly after 1973) export instability (17), although the rapid growth of real export earnings causes the value of the composite index IG to be reduced for these countries. The exclusion of this particular class of exports leads to a rather more consistent picture in which there is undoubtedly a linkage between instability and concentration.

The policy implication of the existence of a strong relationship of this type would be to reduce the degree of concentration in an

Table 7.5 Coefficients of correlation between export instability and export concentration (a)

	1964-71		1971-78		1964-78	
	I	IG	I	IG	I	IG
Including oil-exporting nations						
Commodity concentration (b)	0.5742	0.3907	0.6270	0.3228	0.7246	0.4020
Diversification (c)	0.4691	0.4754	0.3450	0.5576	0.5125	0.4752
Number of commodities (d)	-0.5115	-0.4839	-0.3561	-0.4818	-0.5745	-0.4229
Excluding oil-exporting nations						
Commodity concentration (b)	0.6346	0.5274	0.4907	-0.6353	0.6895	0.6881
Diversification (c)	0.4935	0.5269	0.4472	0.5662	0.5823	0.5005
Number of commodities (d)	-0.5185	-0.5276	-0.4195	-0.5541	-0.5887	-0.4971

Sources: Calculated from UNCTAD, Handbook of International Trade and Development Statistics, 1979, New York: United Nations (Table 4.5, pp. 273-296) giving index numbers for each of (b), (c), and (d) in the years 1968 and 1976 only; and instability indices contained in Appendix S, Table S.5.1.

(a) Based on a sample of 42 countries, being the original random sample of 44, excluding Swaziland and Yemen for which data was not available.

(b) The Hirschman index of commodity concentration for country j

$$H_j = \frac{\sum \left(\frac{x_i}{X} \right)^2}{1 - \frac{1}{n}}$$

Where n = number of commodities (182 3-digit SITC codes)
 x_i = value of exports of commodity i
 $X = \sum x_i$

(c) Absolute deviation of the country's commodity shares from world structure, i.e.,

$$S_j = \sum |h_{ij} - h_i|$$

Where h_{ij} = share of commodity i in exports of country j
 h_i = share of commodity i in world exports.

(d) Number of commodities exported at 3-digit SITC level; excludes those whose value was less than US\$50,000 in 1968 and US\$100,000 in 1976.

economy, a policy capable of implementation only in the very long term as substantial structural transformation would inevitably be required. While this remains a desirable objective it is clear that the reduction of export concentration is not a sufficient condition for eliminating instability, and that its cause lies in the international markets on which commodities are traded: the degree of concentration merely provides a mechanism by which instability is transmitted to the economies of primary producers.

Once again the point is made that it is not so much the existence of instability which is of concern, but the fact that in many countries there has been a secular decline in the "real" unit value of exports. Appendix S, Tables S.5.2 and S.5.3 contains estimates of two measures of the terms of trade for the 44 countries of the random sample. The first of these measures is the income terms of trade defined as the total value of export earnings deflated by the index of import unit values. The second measure is the net terms of trade, the ratio of the unit value of exports to the unit value of imports (18). In general the income terms of trade have improved (Appendix S, Table S.5.2), although it is clear from the net terms of trade summarized in Appendix S, Table S.5.3 that the principal reason for the increase in the former is the growth of exports by volume. The net terms of trade (or "real unit values of exports") is seen to have declined from relatively high levels in the 1960s, with the exception of the oil-exporting countries.

It would be entirely wrong to conclude that very high concentration is not associated with instability in export earnings in

particular countries even though in general export instability does not correlate strongly with concentration. This is strikingly shown by the results for Zambia where the existence of an abnormally high degree of concentration on the production of the most unstable commodity (see Chapter 5) produces a combination of circumstances resulting in the extraordinarily large decline in both the income and net terms of trade - 72.5 and 68.5 per cent respectively between 1969 and 1978, a far greater deterioration than experienced by any other country in the sample.

The size of this deterioration provides a preliminary indication of the size of the process of adjustment to external (and exogenous) factors with which Zambia was faced during the 1970s. The extent of the problem and some of the policy responses are taken up in subsequent sections.

7.5 Features of international balance of payments aggregates

This section is included to provide a very brief summary of some of the chief characteristics of the world balance of payments in order to reveal any divergence in the behaviour of the Zambian economy from any "norms" which may typify other less developed countries. This is done by reference to Table 7.6 which summarizes balance of payments aggregates for 1979. The absence from this presentation of the centrally planned economies means that the table is not truly representative of the world-wide structure, and also results in a small internal inconsistency in the table itself in that, for instance, the global current account balance is non-zero.

Table 7.6 Summary of world balance of payments, 1979

	World	Industrial countries	Oil exporters	Other developing countries	Africa	Zambia	
						1978	1979
	(In billions of SDRs)					(In millions of SDRs)	
Merchandise balance	13.6	-27.4	63.7	-23.8	2.8	183	533
Exports (f.o.b.)	1,073.5	788.4	135.6	137.3	27.5	768	1,118
Imports (f.o.b.)	1,059.9	815.8	71.9	161.1	24.7	585	585
Services (net): balance	-18.8	27.9	-26.9	-18.9	-6.7	-299	-326
Shipment	-19.5	-1.6	-8.3	-9.1	-2.2	-75	-98
Other transportation	-2.8	-3.3	0.2	0.3	0.1	-33	-35
Travel	-3.1	-4.1	-4.1	5.2	0.4	-14	-17
Reinvested earnings	9.9	11.4	-0.1	-1.3	-0.1	-15	...
Other direct investment income	-1.1	10.3	-7.7	-3.6	-0.9	--	...
Other investment income	-6.7	-0.1	6.4	-13.1	-1.9	-100	-120
Other official	-7.3	2.8	-9.0	-0.9	-0.8	2	-4
Other private	11.8	12.5	-4.3	3.6	-1.3	-64	-52
Unrequited transfers	-12.0	-22.1	-6.7	16.8	1.9	-70	-74
Private	2.0	-4.9	-3.2	10.2	0.4	-83	-86
Official	-14.0	-17.2	-3.5	6.6	1.5	13	12
Balance on current account	-17.4	-21.6	30.1	-26.0	-2.1	-186	133
Capital transactions and monetary movements							
Direct investment	-11.5	-17.8	0.2	6.1	0.2	15	...
Portfolio investment	2.5	4.3	-2.1	0.3	-0.4	-1	...
Other long-term capital	12.1	-17.0	3.2	25.5	3.2	3	...
Other short-term capital	10.4	15.5	-8.5	3.9	-0.3	221	...
Errors and omissions	22.9	28.2	-5.0	-0.2	-0.6	-85	...
Reserves and related items (a)	-19.1	8.4	-17.8	-9.6	-0.1	33	...

Source: Compiled from International Monetary Fund, Balance of Payments Yearbook, Supplement to Vol. 31, (December 1980, Tables C-1 to C-12 current account, B-1 capital account).

(a) A negative sign denotes an increase in reserves and vice versa.

The industrial countries account for a dominant proportion of international trade (73.4 per cent of exports and 77.0 per cent of imports), of which a major part is accounted for by intra-group trading. These countries tend to run deficits on their merchandise balance, offset by a net surplus on services, with the result that their current accounts may be in surplus. Their current account balances fluctuate between surplus and deficit as a group: 1979 was a year in which the terms of trade shifted against oil importing countries so that a deficit occurred. However such generalizations conceal considerable variation within the group: Japan and West Germany ran substantial surpluses throughout the 1970s, while the United Kingdom and the French economies incurred large though variable deficits in most years during the same period, and the United States moved from surplus to deficit during the decade. Flows in respect of net services in the industrial countries tend to be positive because of their more highly developed financial and communications systems. But the area in which differences are most pronounced is the income received in respect of direct foreign investment (entered as "reinvested earnings" and "other direct investment income" in Table 7.6). There is a substantial inflow from developing countries related to borrowing from banks in the industrial countries, but an almost equal outflow to the capital surplus oil exporters who constitute one of these banks' most important sources of deposits causes "other investment income" to be in balance. Large outflows occurred in respect of the items "official unrequited transfers", "direct investment" and "other long-term capital", and in each of these cases the main recipients were the non-oil producing developing countries.

The oil-exporting countries particularly those which can now be designated capital surplus countries (e.g., Saudi Arabia and Kuwait) are characterized by very large merchandise balances which since 1973 have been more than sufficient to offset a significant deficit on the balance of services and the substantial outflows of grants which have been extended in the years since the oil price revolution in 1973-74. This group experienced a substantial improvement in its current account surplus in 1979 as a consequence of a further increase in the real price of oil, that is the terms of trade moved in favour of oil exporters.

In Chapter 1 (and Appendix I.1 and again in Section 7.2), it was suggested that a current account deficit was a natural concomitant of the development process, and it was seen that if the framework of the dual-gap model was accepted then it follows that capital inflows (the necessary converse of a current account deficit) would be needed to supplement domestic savings or inadequate foreign earnings. It is an historical fact that the less developed countries have incurred persistent, and in some case chronic, current account deficits, and that these have grown larger in real terms during the 1970s (19). Thus in 1979 the "other developing countries" experienced a larger deficit than the industrial countries, while accounting for only about 13 per cent of total world exports (cf. the industrial countries' 73 per cent). This deficit would have been far larger but for the substantial official unrequited transfers which were made during that year by industrial and oil exporting countries. The deficit was

financed largely by "other long-term capital" the major part of which is loans from governments and financial institutions.

There is, unsurprisingly, much variation within this disparate group of countries. Although less developed countries as a whole typically run deficits on their merchandise trade, the African LDCs, including Zambia, are obliged to operate with a surplus of this "visible" balance by the fact that their "invisible" balance (that on services) is strongly negative (24 per cent of total exports as opposed to 14 per cent for all LDCs). Zambia's ratio of services to exports appears to be even higher than the African average, recording figures of 39 and 29 per cent in 1978 and 1979 respectively. This structural variation is probably associated with countries with a lower level of development, with particular reference to the paucity of financial and other services. For instance, the net outflow on "shipment", that is freight charges on merchandise is a larger proportion of exports in Zambia than in Africa as a whole, which in turn is higher than in any other group. But one of the most serious outflows occurs on investment income, interest on external borrowing and dividends on direct foreign investment. Again Zambia had a higher net outflow relative to total exports (15 per cent) (20) than Africa (10 per cent) or the "other developing countries" (13 per cent). Another major difference on the current account is that Zambia had a net inflow of unrequited transfers, reflecting its eligibility for grant assistance in donor aid programmes, and more importantly the relatively large transfers made by foreign contract employees especially those working in the mining industry. In this respect

Zambia does not benefit from any significant inflow since, unlike many other developing countries, very few Zambians are employed abroad.

With respect to the capital account there is one item, "other short-term capital", on which Zambia showed a substantial variation from other developing countries in 1978 in particular. This is attributable to the substantial amount of "involuntary credit" which has been used by Zambia in the form of accumulation of arrears on external payments (excluding debt service). Reference was made to this phenomenon in section 7.2.4 and the circumstances under which these arrears were allowed to accumulate in Zambia will be discussed later in this chapter.

7.6 The Zambian balance of payments

The time series of Table 7.7 confirm the broad outline of the structural characteristics of the Zambian balance of payments noted in the previous section: that is a consistent trade surplus (with the exception of 1975) and a deficit on "invisibles". The capital account behaves less consistently, but in general capital inflows have been inadequate to finance the cumulative deficit on current account since 1965.

The balance on merchandise trade in Table 7.7 has been defined on the basis of a "c.i.f." valuation of imports: this is felt to give a more accurate reflection of the true foreign exchange cost to Zambia of importation. The series of the merchandise balance is seen to be

Table 7.7 The balance of payments in Zambia: a summary of principal aggregates

(Million kwacha)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Merchandise balance	124.9	152.0	91.6	112.0	479.3	265.2	10.7	57.5	300.2	261.5	-244.7	134.7	52.0	44.9	395.5	29.3
Exports, f.o.b.	366.8	446.0	465.2	534.0	852.6	673.2	479.2	543.2	733.5	898.2	516.2	742.4	707.6	663.8	1,144.7	1,104.3
Imports, c.i.f.	241.9	294.0	373.6	422.0	373.3	408.0	468.5	485.7	433.3	636.7	760.9	607.7	655.6	618.9	749.2	1,075.0
Balance on services and freight	-63.4	-99.3	-83.2	-114.9	-141.0	-188.2	-187.2	-206.3	-206.8	-251.2	-219.1	-223.9	-222.7	-238.5	-259.0	-346.0
Of which:																
investment income	-45.6	-58.0	-50.6	-52.1	-47.5	-33.4	-43.6	-74.1	-77.3	-86.9	-75.1	-105.8	-104.8	-109.5	-123.0	-183.0
unrequited transfers	-3.5	-9.6	0.1	-24.9	-51.0	-104.5	-107.8	-96.1	-80.8	-81.2	-79.9	-79.7	-64.6	-65.0	-76.0	-69.0
Balance on current account	61.5	52.7	8.4	-2.9	338.3	77.0	-176.5	-148.8	93.4	10.3	-463.8	-89.2	-170.7	-193.6	136.5	-343.7
Balance on capital account	...	...	...	...	-158.5	38.2	31.4	76.9	-43.1	103.2	259.4	39.9	35.0	-65.3	...	...
Of which:																
private	...	...	...	...	-166.1	44.5	11.5	63.6	-180.1	104.4	176.4	11.7	19.5	-69.6(b)	...	...
Government	...	...	...	...	7.6	-6.3	19.9	13.3	137.0	-1.2	83.0	28.2	15.5	4.3	...	...
Errors and omissions	...	...	...	...	-60.8	-14.9	-49.0	-39.9	-64.0	-93.3	-45.6	-87.1	-87.8	...	...	...
Change in reserves and monetary movements (c)	...	...	...	...	-119.0	-100.3	194.1	111.8	13.7	-20.2	250.0	136.4	223.5	258.9	...	...
Of which:																
increase in arrears	---	---	---	---	---	---	---	---	---	---	102.1	103.6	156.9	145.3	-148.8	112.6

Source: Appendix S, Table S.6.1.

(a) Differs from Tables 7.6 and S.6.1 in valuing imports on the c.i.f. basis.

(b) Errors and omissions included in "private capital".

(c) Negative signs indicate an increase in net foreign assets, and a positive sign a decrease.

highly unstable (21), and this is related to annual variations in exports as was noted in Chapter 2 (22). The balance on services deteriorated from 1970: in the period 1965-69 this aggregate expressed as a percentage of merchandise exports averaged 19 per cent, while in the subsequent eleven years the average rose to 32 per cent (with a range of 23 to 42 per cent, and a minimum in the 1970s which was higher than the maximum in the former period). Two reasons for this are suggested: the net flow of unrequited transfers increased sharply in 1969 and 1970 possibly as moves towards nationalization in the mining industry and changing employment contracts for expatriate workers caused substantial transfers of earnings and savings abroad. Then as this flow abated, "investment income" rose steadily, largely as a result of higher interest charges on external debt, with the result that this aggregate increased from 5 per cent of export earnings in 1970 to nearly 17 per cent in 1980 (23). .

The evidence of Table 7.7 is that the net effect of an unstable and deteriorating merchandise balance and a deficit on services has progressively increased in absolute terms, is to cause a severe deterioration in the current account of the balance of payments. It is also noted that, although the capital account was in surplus for most of the years for which data is available, this was not sufficient to prevent the overall balance (24) from registering large and persistent deficits particularly in the years from 1975 onwards.

The capital account is in itself a source of instability in the balance of payments (25). The private sector (which includes transactions of the parastatal sector) in particular showed substantial

variation, with two large outflows in 1969 and 1973, the result of compensation payments and borrowing in respect of the nationalization of the mining industry (26), and the extensive nationalization exercise in other industries. The large inflow to the Government sector in 1973 is due to the Euro-currency loans raised to finance the redemption of the ZIMCO bonds issued in lieu of direct monetary compensation for the nationalization of the mines. Reference to more detailed presentation of the capital account such as Table 7.8 (27) shows that direct foreign investment represents only a small proportion of capital inflows, although the flow from this source is relatively stable. As was noted above individual categories within the capital account can be heavily influenced by a single large transaction; nevertheless a cursory examination of Table 7.8 suggests substantial instability in all the major sources of capital flows. Long-term official sector receipts are influenced by two factors: creditors' willingness to release funds (which is not believed to have been a problem during the 1970s); and the Government's ability to absorb or accept external finance. For reasons which are not explored here (28) the disbursement record of some loans extended to the Government was very poor with substantial numbers of committed loans remaining unutilized for long periods. This did not prevent capital repayments on previous loans falling due, and as the level of external indebtedness increased so too did the outflow on this item. An additional source of instability in the capital account was the large rise in the volume of short-term credit which was used by all sectors after 1975. Although the major part of this was accounted for

Table 7.8 Principal capital account transactions: Zambia, 1972-79 (a)

(In millions of SDRs)

	1972	1973	1974	1975	1976	1977	1978	1979
Direct foreign investment (net)	27	27	32	31	27	15	...	...
Portfolio investment (net)	-12	1	-5	-5	-4	-1	-2	...
Long-term								
Official sector (net)	28	178	49	106	36	19	5	137
Receipts	(44)	(192)	(75)	(129)	(64)	(63)	(46)	(178)
Payments	(-16)	(-14)	(-26)	(-25)	(-28)	(-44)	(-41)	(-41)
Deposit banks (net)	--	--	--	--	--	--	--	--
Other sectors	51	-219	-13	172	49	-16	8	...
Receipts	(84)	(20)	(39)	(174)	(54)	(2)	...	...
Payments	(-31)	(-239)	(-52)	(-2)	(-5)	(-18)	...	...
Short-term								
Official sector (net)	--	6	1	101	-25	14	-19	-23
Deposit banks (net)	11	5	-2	10	-4	16	-13	-57
Other sectors (net)	4	-54	67	159	63	191	184	-168
Of which: arrears	--	--	--	131	124	170	143	-145
Total	111	-56	129	575	142	238	42 (b)	-125 (b)

Source: International Monetary Fund, Balance of Payments Yearbook, 1980, Washington: International Monetary Fund (pp. 641-2).

(a) Not compatible with other tables in Chapter 7 due to possible differences in definitions.

(b) Totals for 1978 and 1979 based on incomplete information.

by the arrerars on external payments, this was by no means the only item, and an increase in short-term indebtedness possibly reflects a greater willingness on the part of importers and the monetary authorities to use the medium of extended suppliers' credit and other short-term credit facilities.

In principle the item "Errors and omissions" should, in the long run, register a cumulative total of zero. This is noticeably not the case in Zambia, where in the period 1969-77 this item showed a mean value of K60 million. No firm explanation is offered for this but reasons which are plausible or which have been suggested to the author include exchange control evasion by residents of the country, unrecorded defence expenditure and currency smuggling and other illegal methods of externalising Zambian currency.

The extent of the decline in Zambia's foreign reserves is summarized in Table 7.9 with fuller detail in Appendix S, Table S.6.2. The treatment of arrears presents a methodological problem: official statistics do not record these among net foreign assets since they are liabilities of the non-banking sector (net foreign assets refer to the reserves of the monetary authorities and commercial banks). However, the existence of arrears represents a direct claim on the country's foreign currency resources in a way which is markedly different from other debt liabilities of the non-banking sectors, in that arrears are short-term liabilities which must be paid immediately, while even short-term loans are amortized over pre-determined schedules. It is therefore believed to be more accurate to consider the arrears as a

Table 7.9 Foreign reserves: Zambia, 1965-80

(Million kwacha)

	Gross foreign reserves (a)	Net foreign reserves (b)	Arrears	Total net foreign assets (c)
1965	153	149	--	149
1966	167	158	--	158
1967	144	135	--	135
1968	147	140	--	140
1969	274	268	--	268
1970	385	382	--	382
1971	210	186	--	186
1972	125	79	--	79
1973	130	67	--	67
1974	144	77	--	77
1975	101	-75	-102	-177
1976	89	-115	-206	-321
1977	64	-184	-363	-546
1978	74	-312	-508	-819
1979	146	-283	-359	-642
1980	116	-388	-472	-860

Source: Appendix S, Table S.6.2.

(a) Assets only.

(b) Assets less liabilities.

(c) Net foreign reserves plus arrears.

type of foreign liability, a treatment which makes the deterioration in Zambia's net foreign reserves appear even sharper in the years from 1975.

An examination of the data relating to foreign reserves in Table 7.9 yields the following synopsis of developments in the balance of payments since 1965. In the period up to 1970 the current account was strong with a deficit in only one year. This allowed the authorities to accumulate an exceptionally high level of foreign reserves and meant that Zambia did not become a major debtor country until well into the 1970s as will be seen in Chapter 9. The reason for this lies in the strength of the merchandise balance, a result of the historically high real price of copper discussed at length in Chapter 5. A sharp reversal appears to have commenced in 1971 with a weakening current account balance, notably in 1972 and 1973, which could be financed relatively easily by the accumulation of reserves and a limited amount of external borrowing. The year 1975 witnessed a further deterioration with the rapid fall in the LME price of copper, and a significant increase in imports resulting in the country's first ever deficit on the balance of merchandise trade. In this year and subsequently the current account deficit could no longer be financed by the decumulation of reserves, and although greater use was made of long-term external borrowing both by the Government and other sectors net flows of capital account (including reserves) were insufficient. Thus Zambia began to accumulate substantial arrears on payments for goods and services already supplied.

The arrears accrued in respect of almost all current account transactions with the exception of debt servicing, and it became a matter of some pride, and was certainly a primary objective of Government policy, that no serious default was allowed to occur on the country's external debt commitments (with respect both to interest and amortization). It is a matter for conjecture whether, if Zambia had defaulted on contractual debt repayments, it might have received a much larger and earlier response to its external financial predicament. Certainly there were countries which had a much lower accumulation of arrears which defaulted on debt service. For instance both Zaire and Turkey experienced acute debt servicing problems in the late 1970s and both countries negotiated major refinancing packages with their banking creditors and the IMF (for instance see Friedman (1978) on Zaire), even though official balance of payments statistics provide no evidence of the existence of arrears. In the case of Zaire a formal refinancing probably was the only feasible way of covering its external commitments, since its suppliers would almost certainly not have been willing to continue the supply of imports of goods on credit. The strength in earlier years of Zambia's balance of payments ensured that it was able to continue to import goods on short-term (suppliers') credit for a considerable period after arrears had begun to accumulate.

Two institutional features would have protected suppliers from the consequences of Zambia's inability to pay promptly: the existence of export credit guarantee schemes in the exporting country designed to protect individual firms from having to bear the cost of default,

and secondly, the fact that parent companies with wholly or partly owned subsidiaries in Zambia would be interested in attempting to preserve their operations in the country for as long as possible, even if this meant extending "involuntary credit" to this subsidiary. In any case this latter group of creditors would not be unduly concerned by the accumulation of such credit since the transaction would be occurring within the group and would also be carrying a penal rate of interest which might be higher than that which could be earned by investing in the money markets.

One reason that Zambia itself may not have been unduly concerned to negotiate a formalized arrangement with the international banks to finance the arrears may be that such a scheme might have been rather more expensive. The arrears on merchandise imports carried substantial penal rates of interest by the conditions of the original suppliers' credit. However, such penalties did not apply to a large proportion of the non-merchandise arrears, such as externalization of company dividends, personal remittances, emigration allowances, and payments due for the transportation of goods or passengers. The authorities paid interest at a low rate (ranging from 2 to 4 per cent on blocked balances but these were well below international rates. Any scheme to completely eliminate the arrears would almost certainly have increased Zambia's debt service cost since it would have required external borrowing.

Some of the trends noted in earlier paragraphs are more clearly identified by Tables 7.10 and 7.11 and Figures 7.1 and 7.2. Both

Table 7.10 Principal balance of payments aggregates expressed in constant (1970) prices: Zambia, 1965-80

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979(a)	1980(a)
	(Indices 1970 = 100)															
Exports	65.8	77.7	83.4	84.9	141.0	100.0	68.0	72.6	86.5	85.3	39.6	51.0	42.3	32.1	46.3	36.6
Imports	71.6	84.5	110.5	110.7	101.9	100.0	109.8	107.1	84.3	99.8	96.2	68.9	64.7	49.4	50.0	58.8
Investment income	164.9	209.5	182.7	167.0	158.4	100.0	124.8	199.7	183.7	166.4	116.0	146.6	126.4	106.8	100.2	122.3
	(Million kwacha)															
Balance on merchandise	150.9	178.2	110.6	119.9	533.8	265.2	10.3	51.7	238.1	167.1	-126.2	62.3	20.9	14.6	107.6	6.5
Balance on services	76.6	116.3	100.3	123.1	157.0	188.2	179.0	185.7	164.1	160.5	113.1	103.5	89.8	77.7	70.4	77.2
Balance on current account	74.3	61.7	10.2	-3.1	376.8	77.0	-168.7	-133.9	74.1	6.5	-239.3	-41.3	-68.8	-13.1	37.1	-76.7
Balance on capital account	...	...	...	...	-176.5	38.2	30.0	69.2	-34.2	66.0	133.8	18.5	14.1	...	...	...
	(Indices 1970 = 100)															
<u>Memorandum items:</u>																
Export unit values	67.6	104.6	93.8	109.6	118.2	100.0	75.9	76.6	114.2	137.8	83.4	101.5	110.4	117.8	171.5	189.2
Import unit values	82.8	85.3	82.9	93.4	89.8	100.0	104.6	111.1	126.0	156.4	193.8	216.1	248.2	307.1	367.5	448.0
Terms of trade: annual trend (b)	138.8	122.6	113.2	117.3	131.6	100.0	72.6	68.9	90.6	88.1	43.0	47.0	44.5	38.4	46.7	42.2
	...	...	124.7	116.9	106.9	98.1	92.7	84.0	72.6	67.5	62.6	52.2	43.9	43.8	...	...

Source: Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office (various issues, Tables 24-25) and author's calculations.

(a) Data for unit values available from Zambian sources. Zambian import unit values assumed to increase in line with copper wholesale prices (IMF data).

(b) Five year moving averages.

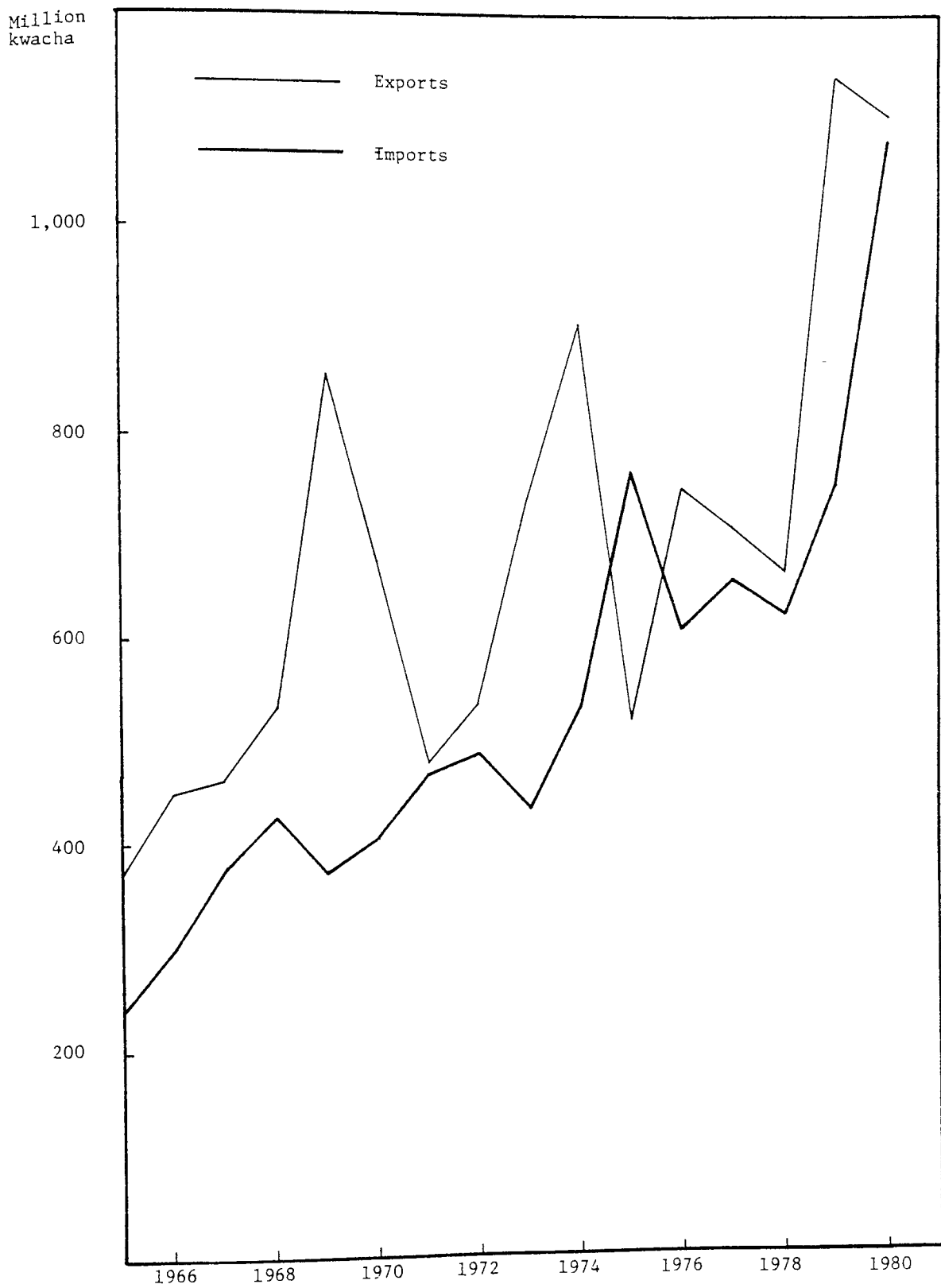
Table 7.11 Trend values of principal balance of payments aggregates: Zambia, 1967-78 (a)

	Indices (1970 = 100)				Million kwacha			Current account balance
	Exports	Imports	Investment income	Merchandise balance	Balance on services			
1967	90.6	95.8	176.5	218.7	-114.7	104.0		
1968	97.4	101.5	163.5	241.5	-137.0	104.5		
1969	95.5	106.6	146.6	208.0	-149.5	58.4		
1970	93.3	105.9	150.0	196.2	-166.6	29.6		
1971	93.6	100.6	153.3	219.8	-174.8	45.1		
1972	82.5	100.2	154.9	146.5	-175.5	-29.0		
1973	70.4	99.4	158.1	68.2	-160.5	-92.3		
1974	67.0	91.3	162.5	78.6	-145.5	-66.8		
1975	60.9	82.8	147.8	72.4	-126.2	-53.8		
1976	50.1	75.8	132.9	27.7	-108.9	-71.2		
1977	42.3	65.8	119.2	15.9	-90.9	-65.1		
1978	41.7	58.4	120.5	42.4	-83.7	-32.6		

Source: Calculated from Table 7.10.

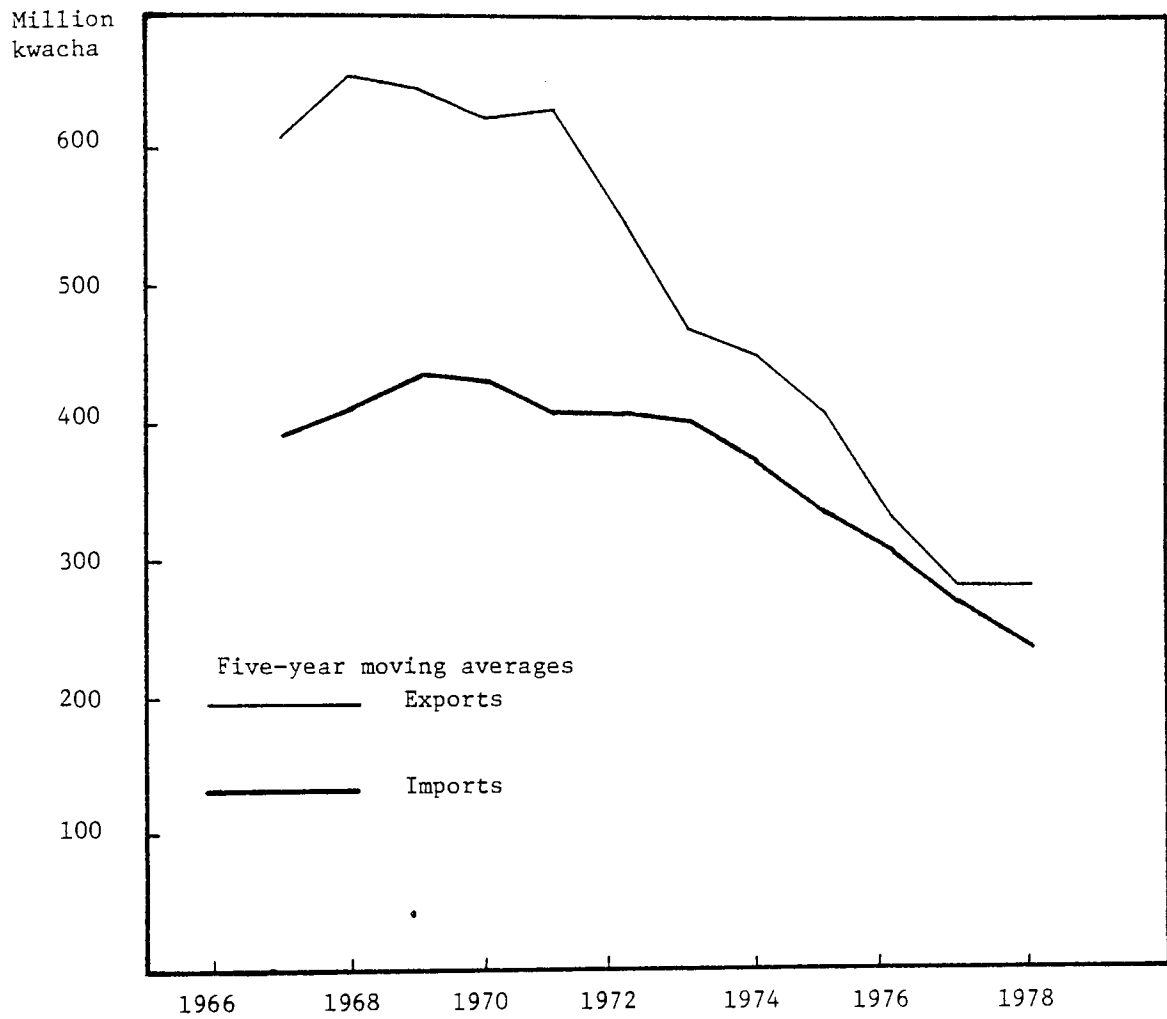
(a) Five year moving averages based on data for 1965-80.

Figure 7.1 Merchandise trade at current prices: Zambia, 1965-80



Source: Table 7.10.

Figure 7.2 Trends of merchandise trade at constant (1970) prices:
Zambia, 1965-80



Source: Table 7.11.

tables and Figure 7.2 deal with some of the principal balance of payments aggregates expressed in constant prices. As might be expected the volume of both exports and imports is clearly seen to have declined during the 1970s, a point emerging from the five-year moving averages of the series expressed as indices (base year 1970). A secular decline in the trend value of exports is seen to have commenced in 1968, and a similar decline commenced in imports one year later. In both cases the falling trend in trade volumes continued unabated throughout the 1970s. The fundamental weakness confronting the Zambian balance of payments is encapsulated in Figure 7.2, which shows not only that both trade aggregates have declined continuously, but that exports have declined much more rapidly so the real value of the surplus on the merchandise balance had almost been eliminated by the late 1970s. In 1969 the merchandise surplus represented 56 per cent of exports; by 1978 this had fallen to 6 per cent. Thus the economy was no longer able to generate the foreign exchange resources necessary to sustain payments on this "invisible" account. Table 7.11 shows the "real" balances on merchandise trade and services, with the former declining rapidly after 1968. Although the deficit on services is expressed in 1970 prices contracted after 1972, this has been insufficient to prevent a secular deterioration in the current account balance.

Figure 7.1 illustrates a rather different feature of external trade - the susceptibility of both imports and exports to large annual variations. It is clear that exports show rather greater instability, and this has been discussed extensively in Section 7.3, but imports

values fluctuated substantially particularly in the years after 1973, and the line graphs of both series suggest that a lagged relationship exists in which changes in exports lead variations in imports by one year. The results of various regressions of imports on exports is presented in Table 7.12 using both current and constant prices, and attempting to isolate long-term from short-term relationships by using annual data as well as five year moving averages to represent long-term trends. The results provide strong evidence of a lag of at least one year in the response of imports to change in the value of export earnings. The analysis also shows that the long-term relationship is rather stronger than the short-term one, with the strongest being that between the trend values of "real" exports and imports (measured as five year moving averages) and with the latter lagged by one year, and this provided a coefficient of determination (R^2) of 0.9761.

The implications of this analysis are that the value of exports is of critical importance in determining the annual value of imports, and that the relationship is even stronger in the long run. However, as might be anticipated from the earlier discussion real import values proved to be inelastic with respect to export earnings. The elasticity coefficients for the runs using constant (1970) prices were all significantly less than one even at the 0.5 per cent level. It might be expected on a priori reasoning that the long-term elasticity might be rather greater than the short-term coefficients; but although the coefficients yielded by the regressions were higher for the long-term elasticity the difference proved not to be significant even at the 10 per cent level. The explanation lies in the historical sequence

Table 7.12 Regression of imports on exports: constant and current prices (a)

Variable	a	b	R ²	t (b)	F
<u>(Current prices)</u>					
Unlagged exports annual data (n = 16)	2.387	0.8266	0.4988	3.733	13.93
Lagged exports annual data (n = 15)	1.820	0.8808	0.6169	4.576	20.93
Unlagged exports five year moving averages (n = 12)	0.0037	1.8195	0.8442	7.36	54.18
Lagged exports five year moving averages (n = 11)	0.00042	2.171	0.8890	8.49	72.10
<u>(Constant 1970 prices)</u>					
Unlagged exports annual data (n = 16)	15.294	0.5093	0.5501	4.137	17.11
Lagged exports annual data (n = 15)	7.160	0.6319	0.7466	6.193	38.35
Unlagged exports five year moving averages (n = 12)	7.311	0.5888	0.9026	9.624	92.63
Lagged exports five year moving averages (n = 11)	4.170	0.7114	0.9764	19.30	372.33

Source: Calculated from Tables 7.7, 7.10, 7.11 and Appendix S, Table S.6.1.

(a) Data fitted to log linear function, $IMP = a EXP^b$, where IMP and EXP are the annual values of imports and exports respectively.

(b) The t-statistic associated with the coefficient b.

of events described in previous paragraphs, that is that imports were maintained at levels above those justified by prevailing export earnings, firstly by the decumulation of foreign reserves and later by incurring external payment arrears.

7.7 The capacity to import

Despite any resistance of import volume to variations in "real" export earnings, the statistical correlation between these variables is rather stronger than that between imports and gross domestic product, that is the marginal propensity to import. If current values are taken of each variable an apparently strong relationship is established with a correlation coefficient of 0.9004 (30), but it is suggested that this is because of a failure adequately to specify the equation - although the two variables move in phase it is due to a third variable (i.e., inflation or changes in the general price level). The use of constant price series established an apparently perverse relationship with a coefficient of correlation of -0.4236 and hence a negative marginal propensity to import ($b = -1.175$), indicating a falling volume of imports, and (because real exports also fell) an increase in domestic production.

Thus the weakness of many economic models noted in Section 7.2, whereby imports are determined by total output is confirmed. The strength of the relationship between exports (especially when lagged) and imports lends credibility to the proposition that the more important concept is the capacity to import, principally governed by the volume of exports, their realization price, the price of foreign reserves, and the net inflow on capital account.

The capacity to import is not frequently explicitly discussed in the economic literature, although passing reference is made by Bruton (1975), Furtado (1975), and Killick (1981a, p. 269). The precise definition of the capacity to import is not always clear, but Maizels (1968), in a more systematic use of the concept, takes it to include total export earnings, net services, and net long-term capital inflows; he also suggests that reserves should be considered. Short-term capital flows are too volatile to include in any assessment of the capacity to import over the medium to long run, and in any case such flows may be a means of financing a level of import demand temporarily in excess of capacity. However, it is felt to be essential to take cognisance of the foreign reserve position - the use of accumulated reserves or the restoration of minimal operational levels - as well as the elimination of payments arrears where these exist.

In Table 7.13 an attempt is made to calculate Zambia's capacity to import in each of the years between 1969 and 1980 inclusive. The most difficult items to incorporate were "net foreign assets" and the external payments arrears, and two assumptions were made concerning their treatment. In case A the assumption is made that the authorities would desire or be prepared to hold zero balances regardless of the level of the beginning of the year: in other words positive net assets would be wholly exhausted in the course of the year, while a negative level would be brought to zero by accumulation of reserves. This is a very severe management policy and in practice (in Zambia at least) would be unrealistic; thus the alternative case B assumes that

Table 7.13 Estimation of the capacity to import: Zambia, 1969-80

(Million kwacha)

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Exports, f.o.b.	852.6	673.2	479.2	543.2	733.5	898.2	516.2	742.4	707.6	663.8	1,144.7	1,104.3
2. Services (net)	-201.0	-248.5	-254.4	-287.5	-290.7	-378.8	-370.4	-349.3	-339.6	-361.3	-409.0	-561.0
3. Private capital long term (net)	-16.1	-97.8	-31.5	60.6	-135.7	52.5	164.2	63.0	-0.4	-37.8))
4. Loans to Government (net)	11.6	9.9	22.3	22.3	138.8	9.6	84.9	30.5	19.3	7.7	)	37.8(c) 82.4(c)
5. Allocation of SDRs	...	6.0	5.8	7.3	...	...	...	...	...	...	15.1	14.6
6. Errors and omissions	-60.8	-14.9	-49.0	-39.9	-64.0	-93.3	-45.6	-87.1	-87.8	...	...	...
7. Sub-total	<u>586.3</u>	<u>327.9</u>	<u>172.4</u>	<u>306.0</u>	<u>381.9</u>	<u>518.2</u>	<u>349.3</u>	<u>399.5</u>	<u>299.1</u>	<u>272.4</u>	<u>788.6</u>	<u>640.3</u>
8. Net foreign assets (a)	140.2	267.8	381.6	186.2	78.6	67.2	76.6	-75.0	-114.7	-183.5	-311.6	-283.1
9. Arrears (a) (b)	...	...	...	...	...	...	...	-102.1	-205.7	-362.6	-507.9	-359.1
10. Capacity to import (c.i.f.f.)												
Case A	726.5	595.7	554.0	492.2	460.5	585.4	425.9	222.4	-21.3	-273.7	-30.9	-1.9
Case B	614.3	381.5	457.9	343.2	397.6	531.6	364.6	364.1	253.7	163.2	624.7	511.9
11. Actual imports, c.i.f.f.	373.3	408.0	468.5	485.7	433.3	636.7	760.9	607.7	655.6	618.9	749.2	1,075.0

Source: Calculated from Appendix S, Tables S.6.1 and S.6.2.

(a) At end of previous year.

(b) Cumulative total.

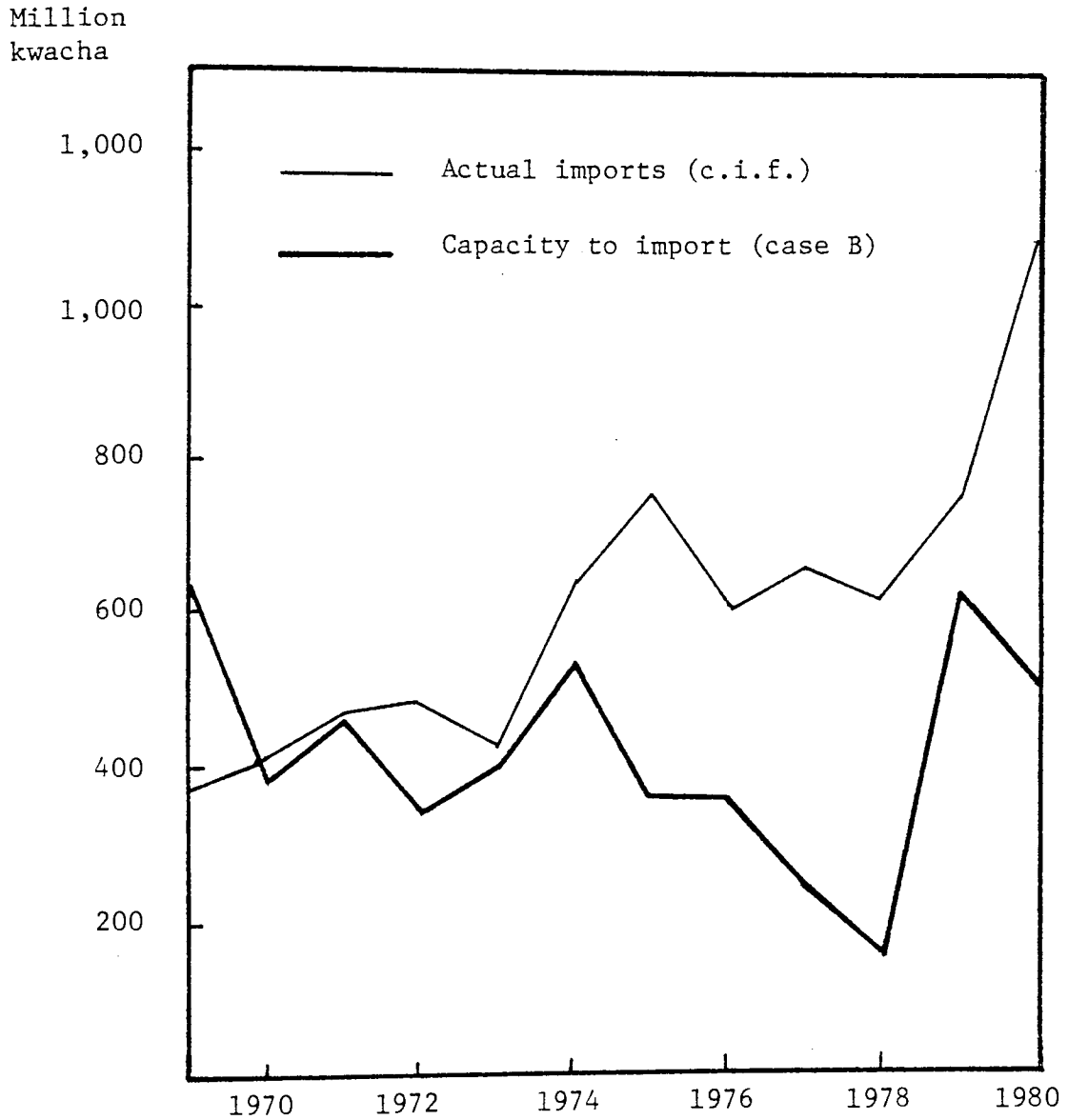
(c) Includes errors and omissions.

these adjustments would be made over five years, so that, for instance, it is assumed that the authorities would wish to reduce arrears gradually. In all other respects cases A and B are based upon the same assumptions. The objective was to determine the c.i.f. valuation of the import capacity, and therefore "services (net)" excludes the freight and insurance element of imports. The other components which appear in Table 7.13 follow conventional definitions and are self-explanatory.

The results show the extent and rapidity of the decline in Zambia's capacity to import. A particular feature which is emphasized by Figure 7.3 is that actual imports exceeded capacity as far back as 1970 (under the more realistic case B), thus providing further evidence that the economic decline started considerably before the collapse of copper prices in 1975. But it is equally clear that the recovery of 1979 was a temporary phenomenon.

An examination of Figure 7.3 suggests that the disparity between the f.o.b. and c.i.f. valuations of imports increased in 1975 and thereafter, an observation confirmed by data from an independent source in Table 7.14. This indicates an increase in the transportation element of Zambia's import bill and shows that while the financial constraint on the capacity to import was predominant during the 1970s, it was not the only factor. The entire transportation pattern of external trade changed several times in the years after independence, as routes were closed, re-opened or constructed, causing physical disruption and increasing the cost of transportation.

Figure 7.3 Capacity to import and actual imports:
Zambia, 1965-80



Source: Table 7.13

Table 7.14 F.o.b./c.i.f. conversion factors (a):
Zambia, 1965-80

Year	Factor
1965	1.156
1966	1.156
1967	1.173
1968	1.182
1969	1.191
1970	1.172
1971	1.167
1972	1.201
1973	1.214
1974	1.229
1975	1.225
1976	1.205
1977	1.173
1978	1.199
1979	1.208
1980	1.200

Source: International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington: International Monetary Fund.

(a) Value of imports (c.i.f.) divided by imports (f.o.b.)

Table 7.15 provides clear evidence of the disruption caused by changes in external trading routes. In 1972, the year prior to the final closure of the border with Rhodesia, almost two-thirds of Zambia's trade was carried on the Southern route through that country. The cessation of almost all trade on this route in January 1973 caused an increased demand on other routes, principally the Benguela railway passing through Zaire to the Angolan port of Lobito. The civil war in Angola during and after 1975 resulted in the partial destruction of this railway, so that by 1976 another route which had carried over half of Zambia's trade for two and a half years was no longer available. This placed an intolerable burden on the route to the Tanzanian port of Dar-es-Salaam, which until 1975 had been served by road only. The loss of the Benguela railway coincided with the completion of the Tanzania-Zambia railway (TAZARA) somewhat ahead of schedule, and in the first year of its operation it was called upon to handle about three-quarters of Zambia's external trade. The port of Dar-es-Salaam proved unable to handle this volume of traffic, and the operational problems encountered on TAZARA led to serious congestion at the port which at its worst forced the stockpiling of goods at the minehead, throughout the 1,200 mile route and the port itself. Some of the effects of this for the mining industry were examined in Chapter 6. So acute did the problem become that the Zambian Government had no option by October 1978 but to re-open the route through Rhodesia, so that by the time the latter had gained legitimacy and majority rule in 1980 the volume of Zambian trade passing through the country had risen to about 40 per cent of the total. Statements were issued by various

Table 7.15 Structure of Zambia's external trade by principal route

	Total trade (thousand tonnes)	Percentage of trade routed via										Air freight	
		Zaire/ Angola	Tanzania	Malawi	Mozambique	Kenya	Botswana	Zimbabwe	Rhodesia/				
Exports													
1972	853	20	25	1	--	--	--	55	--	--	--	--	--
1973	813	54	35	5	--	--	6	1	--	--	--	--	--
1974	924	55	35	1	--	--	9	--	--	--	--	--	--
1975	782	40	50	9	1	--	--	--	--	--	--	--	--
1976	901	15	75	5	4	--	1	--	--	--	--	--	--
1977	871	15	81	4	--	--	--	--	--	--	--	--	--
1978	817	12	78	2	2	--	--	4	--	--	0.1	--	1
1979	766	7	52	2	--	--	--	38	--	--	--	--	--
Imports (excluding oil)													
1972	1,296	11	19	3	--	--	--	66	--	--	1	--	1
1973	859	49	23	13	--	0.4	8	4	3	3	3	--	3
1974	982	45	29	13	--	2	9	--	3	3	3	--	3
1975	879	29	43	15	3	5	3	--	2	2	2	--	2
1976	760	1	76	9	8	1	3	--	1	1	3	--	3
1977	673	--	85	4	1	7	--	--	7	7	3	--	3
1978	655	--	68	2	9	5	--	13	5	5	3	--	3
1979	782	--	46	4	3	--	--	44	--	--	3	--	3

Source: Bank of Zambia, Report and Statement of Accounts, Lusaka: Bank of Zambia, 1974 (Table 6.2), 1977 (Table 6.1), 1979 (Table 6.1).

authorities on numerous occasions suggesting that the Benguela railway might be re-opened, but by the end of 1981 no apparent progress had been made mainly because of the continuing guerilla activity in the part of Angola through which the railway passed.

The precarious state of Zambia's external transportation system was an important constraint during the 1970s and undoubtedly contributed to the decline of Zambia's capacity to import. These transportation problems must also be regarded as part of the costs of the United Nations sanctions against Rhodesia and indeed it could be argued that sanctions cost Zambia more dearly than Rhodesia. Despite considerable political sympathy for the country's predicament it is almost certainly true that Zambia never received full compensation for these costs which by 1978 were estimated by the United Nations Coordinator of assistance to Zambia, Sir Robert Jackson, to have reached the equivalent of over US\$1,000 million (31).

7.8 The policy response

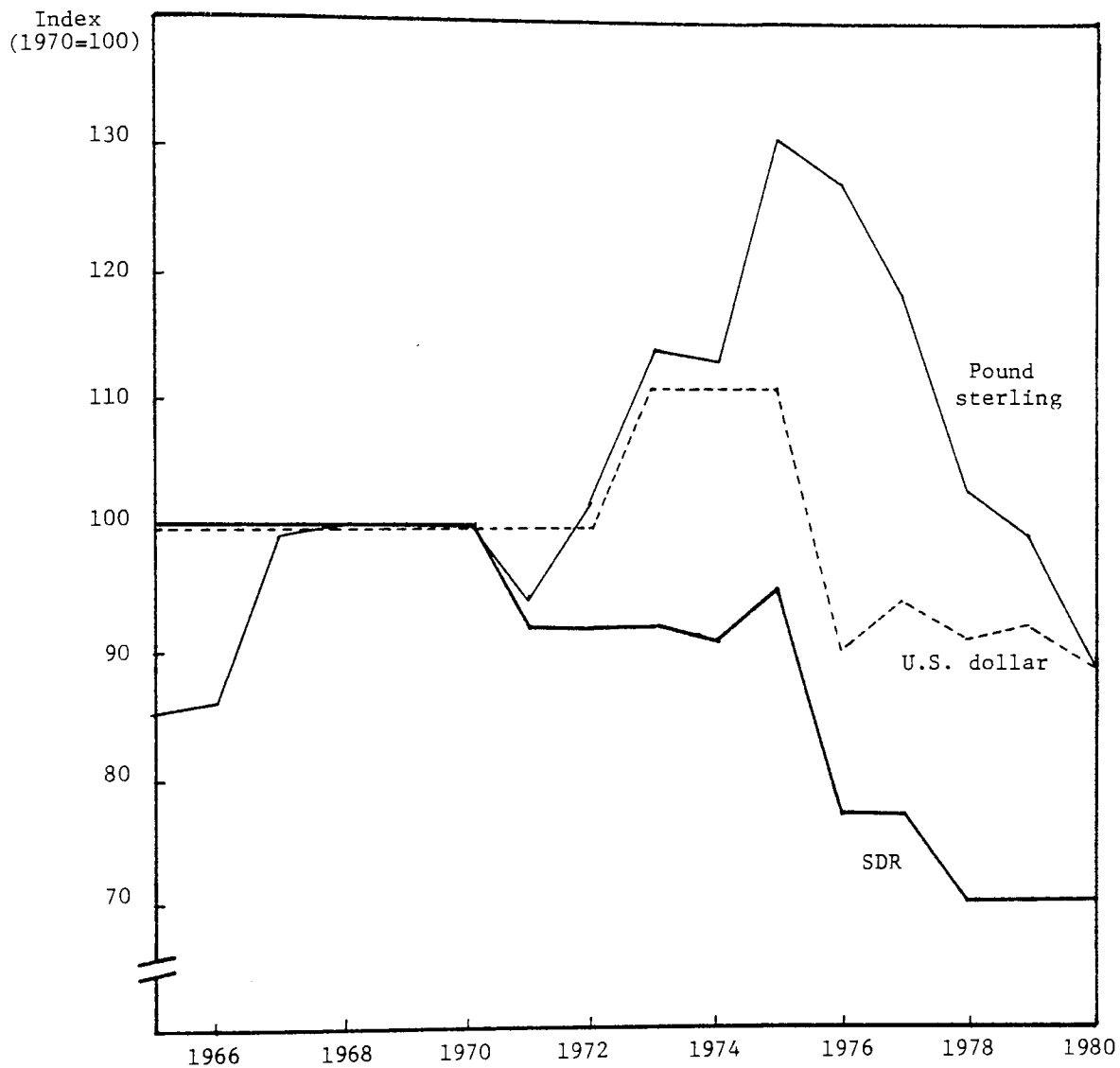
The response of the Government and the Central Bank (the Bank of Zambia) to the foreign exchange crisis described in the previous sections covered most of the measures described in Section 7.2: exchange rate manipulation, exchange controls and import licencing, fiscal measures such as action on import tariffs and seeking increased medium- and long-term borrowing including the negotiation of a large IMF stand-by facility. Although it might be argued that the authorities may not have acted sufficiently promptly, or with adequately strong measures, the reversal of the trend in the terms of trade was

so severe during the 1970s, that only fundamental structural changes could have provided any protection. It is therefore the failure to achieve a more balanced economy with greater export diversification that allowed the problems to become so severe. Action involving short-term policy measures might restrain the rate of decline, but would be ineffective or counter-productive unless they were implemented in parallel with measures to resolve the structural imbalances.

The measures adopted included some exchange rate manipulation but these took the form of infrequent, relatively large adjustments. In November 1967 the Zambian pound was not devalued in line with sterling to which it had previously been pegged, an effective devaluation of 17 per cent (32). When the new currency, the kwacha, was introduced in 1968 it was pegged to the U.S. dollar, a regime which continued until July 1976, although in 1973 the rate was adjusted upwards in response to the U.S. dollar's devaluation. In 1976 the kwacha was devalued by 20 per cent against the U.S. dollar and also was re-pegged, this time to the SDR. The intention was to eliminate the large unpredictable fluctuations which resulted from the link to a single currency, and which had no bearing on the performance of the Zambian economy. For instance the peg to the dollar led to a rise in the kwacha's value against the pound sterling in 1975 and 1976 (see Figure 7.4), a far more important trading partner, thus creating the anomaly of an appreciating currency in an economy severely constrained by balance of payments deficits. A further devaluation of 10 per cent was effected in 1978 as part of the programme agreed with the IMF, one of the stated intentions of which was to restore the profitability of

Figure 7.4 Exchange rates, 1965-80

(Indices of currency units per Zambian kwacha (end of period), 1970=100)



Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook 1981, Washington: International Monetary Fund.

the mining sector as discussed in Chapter 6. The movements of the kwacha against the three currencies to which it has been pegged are charted in Figure 7.4, which shows the extent to which the currency appreciated against the dollar and sterling during the period 1972-75. This appreciation of the currency may provide a partial explanation of the increase in the value of imports (in current prices) which occurred in those years, since it indicates a fall in the relative price of imports (against domestic prices). This would have increased the nominal demand for imports even if effective demand was constrained by foreign exchange availability, placing further pressure on the balance of payments.

Exchange control measures were introduced in 1971 and strengthened repeatedly thereafter (34). In the first instance these were applied to the "invisible" account but by 1972 the system of import licencing, originally introduced to control imports through Rhodesia, was extended to cover most imports, with a government committee assuming the task of monitoring wide range of merchandise imports. In 1973 the mining companies were brought within the compass of the controls by virtue of their changed status following the redemption of the ZIMCO bonds (35). By 1975 the Bank of Zambia was insisting that it should endorse all import licences, and in 1976 it required that any letter of credit issued in respect of imports should first be approved by itself. This followed a sequence of events in which an "excessive" number of import licences were issued in 1974, were subsequently cancelled and then revalidated if they accorded with stricter criteria (36). Further adjustments were made in 1977 and

subsequent years mainly to payments on the invisible account, but in some instances measures were intended to act as incentives to induce investors to retain funds in the country. In these latter cases, special status was given to dividends and other corporate remittances held in blocked accounts awaiting externalization: if these were re-invested they would be regarded as foreign investment with all the exchange control advantages which that entailed. Also, in 1978, the ratio between a foreign company's debt liabilities to Zambian institutions and its external equity capital was decreased from 1:2 to 1:3, in an attempt to induce a greater inflow on capital account. Finally in 1978 an "Import supervision scheme" was introduced under which imports were subjected to a pre-shipment inspection to monitor price and quality (37).

The system for allocating the resources available for imports on a quarterly or monthly basis has never been formally stated by the authorities. The procedure was roughly as follows (38): the Bank of Zambia would determine the resources available for a given period (quarter or half-year) and communicate this to a high level government committee which would determine the allocation for about a dozen broad sectors. A lower level committee of officials then examined requests from individual companies and other importers for allocations of foreign exchange for specific purposes. Applications for import licences for each intended import were submitted to this same committee which examined them within the guidelines currently in force, and within the company's foreign exchange allocation.

Despite this detailed and supposedly comprehensive surveillance of the country's imports, there were many fundamental weaknesses: the periodic total foreign exchange releases were not determined by any systematic "budgeting" process such as the model of the capacity of import suggested earlier in this chapter. Similarly the issue of import licences, being determined by committee (or other political directive) was not based on a systematic economic analysis of the country's import requirements. Also the import licencing and control system did not cover certain major imports - notably oil and military expenditure, both of which tended to be regarded as exogenous factors. Finally the value of the import licence applied to the f.o.b., and not the c.i.f. value, so that once a licence was approved there was no control over the method of importation, and by the latter part of the 1970s many importers were using air freight, which had a high foreign exchange element.

Exponents of the market mechanism would also argue that the system described represents an ineffective means of allocating resources. There is no doubt that the price mechanism was supplanted by one more compatible with a centrally planned or "command" economy. However, in view of the severity of the decline in the capacity to import, and the existence of other market imperfections (39), a non-market solution was inevitable. The problem lies in the inability of the Zambian planning and administrative machinery to handle the volume and complexity of decision making involved.

There is no question that Zambia also attempted to increase the flow of resources to the capital account, mainly by seeking foreign loans, and as will be seen in Chapter 9, its indebtedness to a wide variety of creditors (multilateral financial institutions, international banks, governments, etc.) increased rapidly. Naturally such borrowing was not costless and the increase of international interest rates in the late 1970s and early 1980s placed an increasing burden on the current account. There was also an attempt to promote private investment by the publication of the Industrial Development Act in 1978, which was intended to allow both foreign and domestic investors to benefit from its provisions. By 1979 response from new private foreign investors had been negligible. The largest individual packages negotiated were those with the IMF: the first for the period 1978-80 which provided a total of about SDR 340 million including the rescheduling of payments amounting to SDR 39 million due under a previous facility (40). A further very large package was concluded in 1981 under the Extended Fund Facility for an amount of about SDR 800 million, under a stand-by arrangement lasting for three years, although disbursements on this were suspended after the performance criteria were not satisfied. Appendix S, Table S.6.3 contains details of the net position over the years since 1971 when IMF facilities were first used by Zambia.

6.9 Conclusion

This chapter has shown the extent to which Zambia's export performance has deteriorated, not only in terms of a simple time series

analysis, but also relative to other countries. It was found that Zambia's export instability was far greater than any other country in a sample of 44 countries, and also that the export instability of other major copper producers was among the highest. The Zambian balance of payments has deteriorated in line with the increasing instability of export earnings, the worsening terms of trade and in spite of a very large decline in the volume of imports. Measures to resolve the crisis undoubtedly had some effect, but they have been inadequate to prevent a large increase in the country's indebtedness and a critical deterioration of the foreign reserve position to the extent that the accumulation of arrears on external payments continued into the 1980s.

Notes

1. For instance reference to any of the International Monetary Fund's Annual Reports since 1973 will show this to have been a ubiquitous subject of concern. Similarly this is reflected in the IMF report (1980, Chapter 4), the World Bank's World Development Reports (1978-1981), and Atkinson et. al. (Cambridge Economic Policy Review, 1980, page 5).
2. This term, previously elaborated in Chapter 2 (Section 2.5.3, footnote 12), will be discussed later in this section. The balance referred to here is that on current account.
3. The origin of the monetary approach to the balance of payments is attributed to Polak (1957), and the debate has been summarized in Johnson and Freubel (1976). A simplified model representing a special case is presented by King (1979, pages 30-39).
4. In January 1981 the number of currencies in the SDR basket was reduced from 16 to 5, which together with their weights were:

U.S. dollar	42 per cent
Deutsche mark	19 per cent
French franc	13 per cent
Japanese yen	13 per cent
Pound sterling	13 per cent

The reference value was the average of daily quotations in the three months ended 31 December 1980. (Source of information: IMF, International Financial Statistics, June 1981, page 5).

5. By increasing import prices in domestic currency and so reducing the volume of imports, and possibly acting on export prices so as to stimulate a better export performance, although reservations stated earlier in this section must be recalled.
6. See Killick (1981a, page 202).
7. See IMF Survey (16 August 1982, p. 245). This covers Fund members only and does not include countries defaulting or failing to make payments on external debt commitments.
8. c.i.f. - cost, insurance, and freight; f.o.b. - free on board.
9. Those countries for which country pages of data appeared in the 1980 Yearbook.
10. G is described in Appendix III.1, and I and IG are developed and described in Chapter 4.
11. Source: World Bank, World Development Report, 1980. The median income for each group was calculated as the mid-point between the fifth and six ranked countries.
12. Copper production started in Papua New Guinea only in 1973.
13. The following unweighted averages were obtained:

	<u>1964-71</u>	<u>1971-78</u>
I	7.88	14.65
IG	5.54	11.86
14. Simple unweighted geometric means.
15. That instability appears higher for Zambia in Table 7.3 than in Table 7.2 is due to the fact that the former relates only to copper (not total) exports and is expressed in kwacha rather than dollars.
16. No attempt was made to correct the collinearity which undoubtedly exists between IG and the rate of export growth.
17. This is instability measured by I without accounting for growth.

18. The unit value of imports was estimated by the use of the world index of the unit values of exports (taken from the IMF's International Financial Statistics). While not accurate in respect of individual countries this method enables a comparison against a common standard for all countries.
19. For instance, this has been a persistent theme of the IMF's Annual Reports from 1973 through 1981.
20. The figure for Zambia refers to 1978; all data for 1979 were not available.
21. There is little reason to postulate that the merchandise balance should follow either a steady or an upward trend, so the indices of instability used in this study are of limited meaning in this case. The indices were calculated and yielded extraordinarily high values of 280.6 for the simple index I and 1080.5 for the composite index IG.
22. See Section 2.5.3.
23. A rather higher proportion of exports had been accounted for by investment income in the 1960s due to the externalization of corporate dividends.
24. The overall balance is equal to the item "change in reserves and monetary movements" with the opposite sign.
25. This is confirmed by the more detailed analysis of the balance of payments contained in the International Monetary Fund's Balance of Payments Yearbook, 1980.
26. The background to the ZIMCO bond issue and redemption were discussed in Chapter 6.
27. The data of Table 7.8 is not directly comparable with other tables in this chapter, since it comes from a different source. Attempts to achieve a reconciliation of IMF with official Zambian (Government and Bank of Zambia) data proved impossible, in the absence of direct access to the primary records.
28. See Chapter 8, where the issue is taken up in Section 8.6.
29. Figures based on value figures deflated to 1970 prices.
30. This was increased to 0.9362. GDP was lagged by one year. There was however no convincing a priori case for using a lagged relationship.
31. Doxey (1980) quotes the report by the Commonwealth Secretariat (1978) which showed that the costs to Zambia of sanctions in the period 1965-68 was US\$100 million, was at least the same in the years 1969 to 1972, and estimated the costs between 1972 and 1977

at US\$744 million. Since sanctions were lifted only at the beginning of 1980 the total costs incurred would have been well in excess of US\$1,000 million.

32. Until January 1968 the currency was the Zambian pound, linked to and at par with sterling.
33. See the statement made to the National Assembly by the Minister of Finance reproduced in the Zambia Daily Mail of 18 March 1978.
34. Details of the main controls introduced may be found in each of the Bank of Zambia's Report and Statement of Accounts, 1971 to 1979 in the section on "Operations and Accounts".
35. See Section 6.1 for a fuller description of the background to this.
36. This is described in Bank of Zambia, Annual Report and Statement of Accounts, 1975 (page 54).
37. See Bank of Zambia, Annual Report 1979 (page 72).
38. No documentary sources can be cited for the procedures discussed in this paragraph; they are described on the basis of the author's direct involvement in various stages.
39. Not the least of these is the fact that a truly free market system would require a freely "floating" currency. In the absence of a foreign capital market for "inconvertible" currencies the exchange rate must be determined by an administrative process.
40. This consisted of SDR 250 million under a two-year stand-by facility, SDR 50 million under the compensatory financing facility, and SDR 42 million in Trust Fund loans.
41. See Chapter 11.

CHAPTER 8 PUBLIC FINANCE AND MONETARY MANAGEMENT

8.1 Introduction

Orthodox economic stabilization policies in both developed and developing countries are designed to reduce domestic inflation and to correct disequilibrium in the balance of payments (1). The underlying analysis and detailed policy prescriptions frequently relate to the control of domestic demand (2), a central component of which is the government budget. Fiscal policy (defined in the broader sense to cover both taxation and expenditure functions) can influence the overall balance between supply and demand by acting on either or both these aggregates. Taxation policy may be used to stimulate domestic production, as too can the judicious use of expenditure designed to promote certain activities. It is probably true to say that expenditure is more frequently used as a means of restraining domestic demand, in programmes whose objective is to reduce a government budget deficit which is being financed by heavy inflationary short-term borrowing from the domestic banking system. Deficit financing has now become an almost universal feature of modern economies, both developed and developing, and it might be argued that the central issue is no longer whether a deficit is desirable or not, but is more a question of determining the extent of the deficit which may be optimal or sustainable without causing economic instability.

In Chapter 1 and Appendix 1.2 it was observed that the domestic resource gap (savings less investment) and the foreign resource gap

'exports less imports) were necessarily equal ex post (3). It needs little elaboration to show that the deficit or surplus in the government budget has a direct bearing on the balance of payments. In most economies, particularly among the less developed countries, the government is a major economic agent; if its saving (4) should be reduced (or indeed if dissaving commences as happened in Zambia) then the balance of payments is immediately affected and will deteriorate unless the savings of the non-government domestic sectors increase by an equal amount. Quite independent of the size of the government's saving (or dissaving) government fiscal policy can have a direct influence on the balance of payments, for example where fiscal instruments affect export or import volumes, and where the government's propensity to import exceeds that of the rest of the economy. Although there is undoubtedly a direct link between the government budget and the current account of the balance of payments, it is not at all clear which of the two variables is endogenously determined. In Chapter 1 it was noted that a substantial body of opinion suggested that the primary cause of economic instability - particularly balance of payments disequilibrium - was a result of government budgetary imbalances and other manifestations of excessive domestic demand. It will be found in the empirical evidence of this chapter that the major cause of the large government budget deficits which characterized the 1970's was the disappearance of tax revenue from the mining (export) sector, and that therefore the direction of cause and effect was opposite to that normally suggested. This has important policy implications since it means that measures should be designed

to help such an economy adjust to a changing external situation, with a view to achieving substantial structural changes. The implication is that policies should be directed primarily at the structure of production, rather than at making variations to the level of domestic demand.

This relationship between government deficit financing and balance of payments disequilibrium is of central importance, since it is one of the areas in which economic policy prescriptions appropriate to developing countries with highly diversified industrial structures are irrelevant or even counterproductive in export oriented primary producing countries. If it is true that a balance of payments deficit is caused by excess demand including a large government deficit then it follows that tighter domestic demand management policy is called for, possibly reinforced by export promotion and exchange rate manipulation. Such a policy reaction would be appropriate only where the source of the problem lies in domestic imbalances, such as might be associated with a developed economy which had "overheated", and where the change in the relative prices of externally traded goods might reasonably be expected to lead to changes in the export/import mix (5). In a primary producing country, such as Zambia, it is probable that if the balance of payments is strong then so too will be the government budget since there will be an inflow of tax receipts. A fall in primary commodity prices would cause a deterioration in both the balance of payments and in the government's financial position. The former would impose restraints on the economy's growth

by reducing the capacity to import. An attempt based on conventional analysis to restore equilibrium by restraining domestic demand would reinforce the contractionary tendency within the economy. Of course it would be incorrect to argue that demand management policies should not be used at all: the point is that balance of payments disequilibrium is far more likely to be associated with external factors in small open primary producing countries. Policy responses must therefore be carefully "tailored" to the individual economy in order to ensure that the imbalance is resolved and not aggravated.

There can be little doubt that the government budget has come to play an increasingly important role in promoting economic development, and this is probably especially true of the African economies. The data of Appendix S, Table S.7.13 show that each of the groups of less developed countries devotes a much larger proportion of total central government expenditure to capital spending and net lending (6); moreover, larger proportions of expenditure are devoted to development oriented categories of current expenditure such as education and various economic services as Appendix S, Table S.7.12 demonstrates. As a generalization it is suggested that this higher degree of government intervention in the direct promotion of economic development arises from necessity, and that the government represents the only means of transferring resources to certain sectors of the economy. Foreign private enterprise would only be attracted to a seriously underdeveloped country by some outstanding comparative advantage - most obvious of which would be the availability of some natural resource such as industrial raw materials or fuel deposits. As

Todaro (1977, page 397) succinctly puts it, "... if the government does not induce development, then it will probably not happen at all".

In addition to this direct involvement, the use of deficit financing may be viewed from a more traditional "Keynesian" perspective as promoting growth by the stimulation of domestic demand. An alternative interpretation with greater application in the semi-industrial (or newly industrialized) countries than in the less developed countries is the use of inflation as a tax on money balances (7). According to this view real resources are transferred from holders of money balances to other economic agents (primarily the government) because the former group must sacrifice the purchase of real goods and services in order to preserve the real value of their money balances. Todaro (1977, page 393) suggests that certain countries, notably Brazil and Argentina, have used this method to promote growth in selected sectors; chronic budget deficits have been financed by borrowing from the banking system, the proceeds being used to finance the accumulation of capital in the chosen industries. However Todaro, quoting empirical research by Little, Scotovsky and Scott, (1970), notes that there is no evidence that this type of deliberately induced inflation has increased the flow of savings.

It has been implied at various points in this thesis that excessive government deficit financing is inflationary: it is important to establish whether this is the case and if so the exact mechanism by which it might occur. There are two central and contentious issues: firstly, it must be established that deficit financing causes

monetary expansion; further and secondly, it must be shown that the growth of the money supply leads to inflation. The inflationary consequences of monetary expansion may be reduced to the extent that the velocity of circulation of money is falling (8); it will be shown that in Zambia the velocity has shown a strong secular decline throughout the period since independence. Furness (1975, page 145-56) suggests that there are four important factors which influence the velocity of circulation, and the direction of any secular trend will depend on which of these is dominant. He distinguishes "idle money" from "active money," the latter being that which must be held for the completion of current transactions, while the former is money held in excess of this minimum. A parallel can be drawn with Keynes' motives for holding money balances: the transactions motive corresponding to the active balances, while the precautionary and speculative motives would accord with the concept of idle money. Furness notes that the velocity of circulation will vary inversely with the proportion of the stock of money which is held in idle balances. Two factors which he suggests will increase the relative level of idle money and so reduce velocity are rising per capita wealth and increasing monetization of the economy (9). Working in the opposite direction, that is to reduce the demand for idle money would be the spread of financial intermediation (so that individuals are encouraged to use bank accounts for both current transactions and savings) and the growth of credit facilities which reduce the need for individuals to hold idle balances to cover future transactions.

The association between deficit financing and monetary expansion depends entirely upon the means by which the deficit is financed. Long-term borrowing from abroad can in certain circumstances create inflationary pressure: this will occur when there is no spare capacity in the domestic economy. If, on the other hand, a shortage of foreign currency is constraining the government's expenditure, when there is excess capacity in the economy then borrowing from abroad allows the government to undertake essential imports, while simulatenously increasing its domestic expenditure. Since this latter situation is the more common, it is not felt that foreign borrowing represents a serious source of inflation. Similarly, long-term borrowing from domestic lenders will not be inflationary, since this represents a transfer of resources (savings) between sectors, and no additional purchasing power is created.

It is short-term borrowing which has the greatest inflationary potential, but even here the exact implications will depend on the source of the credit to the government. Short-term borrowing from the non-bank sectors will have the same effect as long-term borrowing: that is resources are transferred from the private sector to the government with no overall increase in liquidity or purchasing power. Short-term credit extended by the commercial banking sector (10) has the potential to increase the money supply. This arises from the fact that most of this credit will be extended by taking up Treasury Bills or equivalent short-term government securities. Such short-term instruments commonly (and certainly in Zambia) represent one of the banking sector assets which may be included among those which

constitute the liquidity base of the banking system. In Zambia, since 1978, the commercial banks have been required to operate a minimum liquidity ratio of 30 per cent: this means that 30 per cent of their assets must be held in liquid form (defined to include Treasury Bills) and conversely also implies that any increase in liquid assets allows the banks to increase their deposit liabilities to their customers in the ratio 100:30. However it must be stressed that an increase in liquid assets only creates the potential for such monetary expansion; it will be found that in Zambia this potential has not been realized because of the special conditions which existed.

The most inflationary form of short-term borrowing from the banking system is credit raised from the central bank, since money is actually created when it takes new short dated securities from the government; that is, purchasing power is acquired by the government, in the form of a deposit at the central bank and the money supply is increased as soon as expenditure is undertaken. The inflationary impact of such borrowing is reduced only by the extent to which real output increases, and the velocity of circulation decreases. There is a further limited way in which the inflationary impact of such borrowing may be reduced - that is if the monetary authorities are prepared to allow the country's net foreign assets to be decumulated, in order to import goods and services. This option is obviously constrained by the size of the country's foreign reserves and the speed with which the authorities are prepared to allow them to be run down.

Since Zambia, and indeed many other developing countries, have resorted to the extensive use of central bank credit to finance large short-term borrowing requirements, it is apparent that a discussion of fiscal policy cannot be isolated from monetary policy. Moreover, the money supply is directly affected by the movement of net foreign assets, which are equal to changes in the overall balance of external payments (with the opposite sign). The relationships emerge clearly from the basic identity of the assets and liabilities of the domestic banking system of any country (11):

Money	)	(	Net foreign assets
)	(
<u>plus</u>	)	(	<u>plus</u>
)	(
Quasi-money	)	<u>equals</u>	Claims on government (net)
)	(
<u>plus</u>	)	(	<u>plus</u>
)	(
Other items	)	(	Claims on private sector

Thus for instance a balance of payments deficit financed by the decumulation of reserves would cause a contraction of the domestic money supply ceteris paribus. The time-honoured economists' proviso must be stressed for it is unlikely in a country such as Zambia that all else will be equal. As described earlier in this section, a balance of payments deficit is likely to be associated with a fall in government revenue, and hence possibly an increase in net banking system claims on government. The exact impact will clearly vary according to the policy decisions taken by the government. However what should be clear from this brief discussion, is that the money supply in an economy like Zambia's can confidently be described as an

endogenous variable and similarly that monetary policy will largely be passive, subject to policy decisions on the balance of payments and the needs of the government budget.

In this chapter the government budget in Zambia will be examined in some detail, both from the point of view of the structure of revenue and expenditure, and with the intention of determining the reasons for the severe decline in the government's financial position. Finally the monetary aspects of government finance will be discussed briefly, in an attempt to analyse the impact of government short-term indebtedness to the banking system on monetary aggregates and consequently on the rate of inflation.

8.2 Zambian budgetary performance: an overview

The central government budget has proved to be no less vulnerable to mineral price fluctuations than the balance of payments, even though the authorities have made relatively successful efforts to increase the offtake of revenue from non-mineral sources, and this has gone a small way towards reducing the impact of the financial crisis on the government. Nevertheless, in view of the mining sector's contribution to GDP, it would be unrealistic to expect the government to play a significant role in stimulating development without an inflow of tax revenue from the industry.

The decline in the profitability of the mining sector has direct and immediate consequences for the government budget, particularly as one of the results of the takeover of the mining industry in 1970

was that the system of taxation was revised to one based solely on profits - that is royalties and export taxes, which had been based on production or export, ceased to be levied. Thus, unless the mining industry was profitable no mineral revenue would flow to the government. With the sharp decline in the terms of trade discussed in earlier chapters, the mining industry entered a period of severe financial problems including in at least two years the incidence of large losses (12). As will be seen in section 8.3 mineral revenue receipts ceased altogether in 1977 after an extremely large fall in 1975, and no significant receipts were realized until 1980. The disappearance of mineral revenue was the principal cause of the government's financial crisis, although it would not be correct to assert that this was the only reason.

Table 8.1 contains three summary financial aggregates. The current surplus or deficit, being the difference between revenue and expenditure on the current account, represents the level of government saving which is available for investment in development projects or addition to reserves. The overall surplus or deficit has been calculated to show the balance remaining after all capital expenditure (including net lending to non-governmental organisations) and the limited amount of capital revenue. It also includes the item "use of cash balances", the net flow from a variety of "below the line accounts" which the official government budget does not project, and which are inadequately reflected in the summary analysis contained in the annual Financial Reports. The overall surplus/deficit is equal to what will be referred to as the Central Government

Table 8.1 Central government surplus/deficit: Financial years, 1965-80

	1965(b)	1966(b)	1967(c)	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
	(Million Kwacha)(d)															
Current surplus/deficit	56.3	88.4	90.5	92.4	174.7	173.5	-18.2	-17.4	15.1	243.8	-98.7	-119.5	-96.3	-30.2	-129.4	-251.9
Overall surplus/deficit	-14.0	-14.9	1.3	-60.5	-5.1	42.8	-131.2	-102.2	-266.2	91.1	-344.9	-259.8	-279.7	-344.1	-222.9	-578.2
"Residual" surplus/deficit (a)	-4.1	-15.8	17.1	-10.9	24.8	67.4	-81.0	-48.1	-96.8	142.4	-265.4	-194.9	-247.4	-309.0	-70.6	-275.5
	(As percentage of total expenditure and net lending)															
Current surplus/deficit	44.2	47.2	31.0	22.8	47.4	40.6	-3.6	-3.7	2.0	42.3	-12.3	-13.3	-12.1	-3.4	-13.9	-18.6
Overall surplus/deficit	-11.0	-8.0	0.4	-14.8	-1.4	10.0	-25.6	-21.6	-36.2	15.8	-42.9	-29.0	-35.2	-38.2	-24.0	-42.7
"Residual" surplus/deficit	-3.2	-8.4	5.8	-2.7	-6.7	-15.8	-15.8	-10.2	-13.2	24.7	-33.0	-21.7	-31.1	-34.3	-7.6	-20.4
	(As percentage of gross domestic product)															
Current surplus/deficit	7.7	10.4	9.8	8.5	13.2	13.6	-1.5	-1.2	0.9	12.9	-6.2	-6.2	-4.8	-1.3	-5.0	-8.3
Overall surplus/deficit	-1.9	-1.7	0.1	-5.6	0.4	3.3	-11.0	-7.6	-16.7	4.8	-21.8	-13.4	-13.8	-15.2	-8.7	-19.1
"Residual" surplus/deficit	-0.6	-1.8	1.8	-1.0	1.9	5.3	-6.8	-6.0	-6.1	7.5	-12.3	-10.0	-12.2	-13.7	-2.7	-9.1
Memorandum item:																
Savings as per cent of GDP	25.7	28.5	25.3	22.5	35.1	24.1	8.5	9.9	20.8	25.6	-4.4	12.7	9.8	6.4	6.3	-8.9

Sources: Calculated from Appendix S, Tables S.7.1 and S.1.1; and Table 3.11.

(a) Surplus or deficit after long-term borrowing. Equal to short-term borrowing requirement with opposite sign.

(b) Government financial data for periods July-June. GDP figures per calendar year in which financial year ends.

(c) 18 months July 1966 to December 1967 reduced to annual data by pro rata adjustment.

(d) All data in current prices.

Notes: Current surplus/deficit - difference between current expenditure and current revenue.
Overall surplus/deficit - current surplus/deficit plus capital receipts less capital expenditure and net lending.

Borrowing Requirement (CGBR). The final aggregate is the "residual surplus or deficit" representing the deficit which is not covered either by revenue flows or by long or medium-term borrowing (13); it is therefore equal to the Short term Borrowing Requirement (STBR). This latter aggregate was financed almost entirely by the banking system, particularly in the years from 1975, as will be seen in Section 8.5.

The data of Table 8.1, amplified by Appendix S, Table S.7.1, show the evolution of Zambia's budgetary problems. In the years before 1970 the government was a substantial net saver, with large surpluses on current account. So substantial were the surpluses that in only three of these years was it necessary to resort to any form of short-term borrowing, indeed in two years the government's net indebtedness decreased (i.e., there was an overall surplus). In this period the government's financial position was atypically strong among developing countries, further evidence of the virtual absence of financial constraints in these early years (14). From 1971 the pattern was reversed: with the exception of 1973 and 1974, when high copper prices yielded high profits and tax revenue from the mining industry, the government experienced current deficits. In some years these deficits represented a substantial proportion of gross domestic product (chiefly in the period 1975-77), most seriously in 1975 and 1980 when national savings were actually negative, reflecting the government's current account deficit and heavy losses in the mining industry (15). After 1975 a gradual improvement was achieved in the relative burden imposed by the overall deficit, although the improvement in the current deficit was less pronounced; this is due to the

very heavy reductions which were made in capital expenditure. Similarly in 1979, some improvement was seen in the proportion of GDP devoted to the STBR, a result of higher external borrowing which is unlikely to continue at the high levels of that year. However, in 1980 a serious deterioration occurred with a large increase in expenditure (both capital and current) and much heavier resort to borrowing particularly from foreign sources, and from the domestic banks. Nationally, savings also fell to -9.0 per cent.

In summary, Table 8.1 suggests that a major structural change occurred in the Zambian economy, in which the government was no longer a net saver. This is illustrated by Figure 6.1 which compares the national savings ratio with the ratio of the current deficit to GDP, showing the extent to which both aggregates have declined. In other words the government is borrowing, not only to finance capital expenditure but to cover its current spending as well. The evidence of later sections is that this not the result of any deliberate policy action by the government, but is largely the result of the disappearance of mineral revenue, and a growth rate of expenditure which has exceeded that of revenue.

Preliminary evidence of this is provided by Table 8.2, a summary of the trend growth rates of principal government financial aggregates. Rapid growth of all aggregates in the first of the three time periods (1965-70), reflects again the virtual absence of serious financial constraints at that time. There followed a period of much slower - though still positive - growth rates (with the exception of

Table 8.2 Trend growth rates (a) of the government financial aggregates expressed in constant prices (b)

(Percentages)

	1965-79	1965-70	1970-74	1974-79
Current revenue	-1.5	15.4	1.5	-13.1
of which: Non-mineral current revenue (c)	(5.9)	(17.2)	(6.4)	(-3.0)
Current expenditure	4.0	13.2	3.0	-5.8
Capital expenditure	-2.0	28.9	-8.3	-19.4
Net lending (d)	5.9	45.4	9.8	-15.3
Total expenditure	3.3	19.3	4.8	-8.2

Source: Calculated from Appendix S, Table S.7.2.

- (a) Exponential trend growth rates; see Appendix III.3.
 (b) Deflated by implicit price index of total domestic final expenditure at 1970 prices.
 (c) Data available from 1966 onwards.
 (d) Including equity investment. Substantial annual variation means that the growth rates of this component have little meaning.

Figure 8.1 Domestic saving and government current surplus/deficit relative to GDP, 1965-80



Source: Table 8.1

capital expenditure), and then in the final period sharp secular decline was observed among all the variables. Capital expenditure was more seriously affected than current spending by financial constraints. Net lending (including equity investment) was not restrained to the same degree, a result of growing direct state involvement in mining and industry at a time when many of these industries were facing substantial financial deficits. Over the fifteen years from 1965 to 1979 current revenue grew more slowly and declined more rapidly than total expenditure. An indication of the gravity of the loss of mineral revenue is provided by the growth rates of non-mineral revenue which rose significantly more rapidly than total expenditure (and the latter's largest component, recurrent expenditure); even in the years after 1974 non-mineral revenue declined less sharply than expenditure. Thus considerable success was achieved in broadening the tax base, but the improvement was not sufficient to compensate for the dramatic loss of mineral revenue.

Before discussing these trends in greater detail it is worth comparing the Zambian budgetary position with that of other countries. Table 8.3 shows that, by 1978, deficit financing had become an almost universal feature of all types of economies (even the oil exporting countries, where heavy capital expenditure was being undertaken in the pursuit of rapid growth). Unfortunately comparable systematic data are not available before 1973, but it would appear that the industrial countries have increased their reliance on deficit financing as a response to the economic recession of the mid-1970's - the large increase in the ratio recorded in 1975 bears this out. On the other

Table 8.3 Overall deficit/surplus of central government (a):
major country groups

(Expressed as percentage of total expenditure and net lending)

	1973	1974	1975	1976	1977	1978	1979	Average (b) 1973-78
World	-6.3	-4.4	-14.1	-14.6	-11.7	-12.6	-10.3	-10.6
Industrial countries	-4.9	-4.1	-14.4	-14.6	-11.1	-12.2	-9.8	-10.2
Oil exporting countries	2.4	21.3	4.3	-1.3	-6.4	-15.8	...	0.8
Non-oil developing countries	-14.5	-12.4	-17.0	-17.4	-15.3	-14.4	-14.1	-15.2
of which:								
Africa	-13.5	-14.3	-20.3	-26.0	-24.6	-22.3	...	-20.2
Asia	...	-16.0	-21.0	-21.6	-20.2	-20.9	-21.8	-19.9
Europe	-5.9	-8.6	-8.0	-9.9	-11.4	-9.0	-11.4	-8.8
Middle East	...	-30.2	-25.5	-29.3	-23.2	-23.0	-24.9	-26.2
Western Hemisphere	-13.4	-9.8	-16.4	-14.2	-10.5	-9.4	-7.6	-12.3
(Zambia) (c)	-36.1	11.0	-42.4	-36.9	-32.9	-36.1	...	-28.9

Source: Compiled from International Monetary Fund, Government Finance Statistics Yearbook 1981, Washington: International Monetary Fund.

(a) Excludes local, state, or provincial governments where these are distinct legal or accounting entities.

(b) Simple unweighted arithmetic mean.

(c) The data on which this table is based use slightly different deflators, and thus differ from those used in compiling Table 8.1, etc.

hand no such large discrete rise occurred in the case of the less developed countries, and it is suggested that this is because the use of deficit financing is viewed as an integral part of the development process (see Section 8.1 above). It is also clear from Table 8.2 that the relative level of deficit financing in Zambia was markedly higher than the average for the African countries and for the developing countries as a whole. Indeed in 1978 only four countries recorded deficits which represented a higher proportion of total expenditure than did Zambia (16). Thus Zambia had an exceptionally serious imbalance in this regard, even in the context of a period in which deficit financing internationally is high by historical standards.

8.3 Recurrent revenue

8.3.1 Mineral revenue. In the period 1965-70 mineral revenue accounted for approximately 60 per cent of all current revenue (see Appendix S, Table S.7.4), and its rapid decline and eventual disappearance is illustrated in Figure 8.2. Since a royalty system of taxation (based on production rather than profits) was used until 1970 a certain basic level of mineral revenue was assured, plus a "premium" depending on the level of profits. Since copper prices were high and rising in the years before 1970 (17), total current revenue was able to follow a fairly steady upward path. However, after 1970 several factors were to cause reductions in the yield of mineral revenue: the Mufulira mine disaster of 1970 which claimed many lives and caused a substantial fall in production and sales throughout 1971 and 1972; the switch from royalties to a profit-based "mineral tax" and the collapse of mining company profitability.

Table 8.4 Sources of government revenue from mining industry

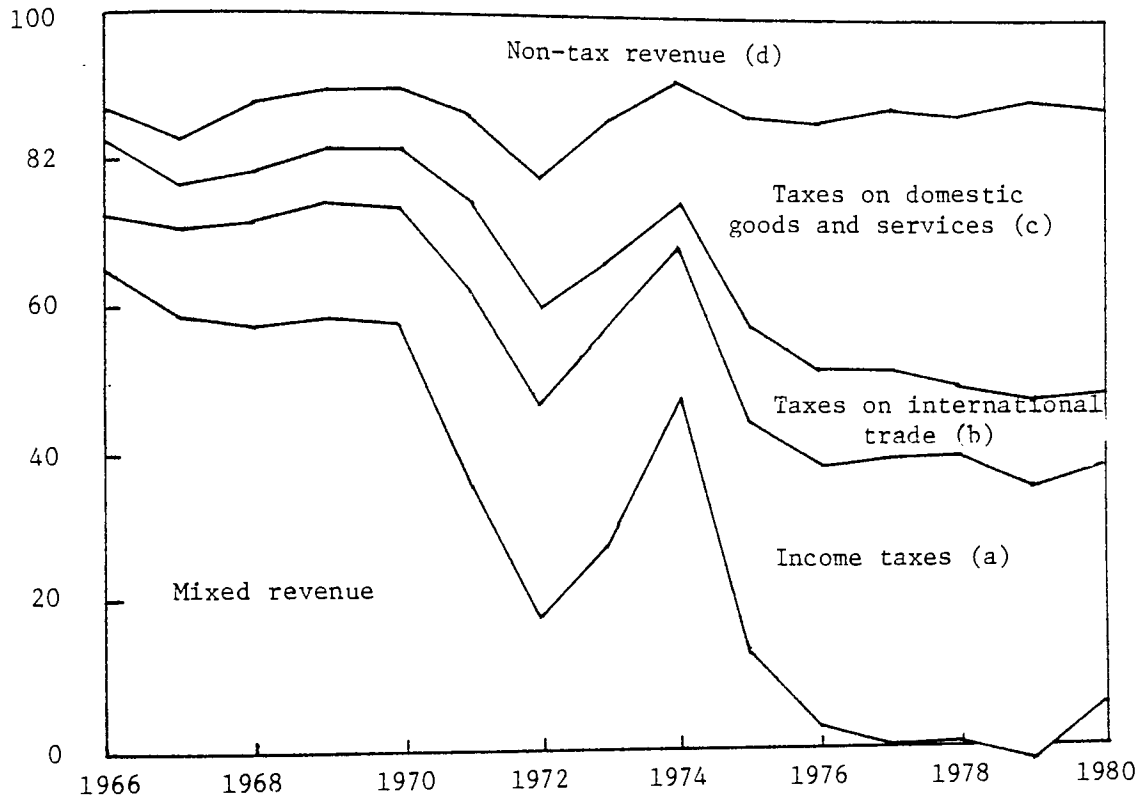
(Million kwacha)

	Company income tax	Royalties	Mineral tax	Export tax	Other(a)	Total
1964/65	...	42.3	--	--	--	...
1965/66	59.1	82.4	--	--	--	141.5
1966/67	52.5	58.1	--	53.2	--	163.8
1968	42.2	65.8	--	68.1	--	176.2
1969	49.5	88.7	--	96.9	--	235.1
1970	79.6	34.2	56.4	80.9	--	251.1
1971	86.9	--	27.2	--	--	114.1
1972	28.0	--	27.7	--	--	55.7
1973	16.3	--	91.3	--	--	107.6
1974	60.5	--	203.2	--	51.0	314.7
1975	61.0	--	-9.3	--	7.8	59.4
1976	9.7	--	1.9	--	--	11.6
1977	--	--	-1.2	--	--	-1.2
1978	0.1	--	--	--	--	0.1
1979	-9.0	--	-0.8	--	--	-9.8

Source: Appendix S, Table S.7.3.

(a) Dividends and withholding tax.

Figure 8.2 Proportionate structure of government revenue by source, 1965-80



Source: Calculated from Appendix S, Table S.7.4.

- Notes:
- (a) Excluding that from the mining industry.
 - (b) Customs duty and sales tax on imports.
 - (c) Mainly sales tax on domestic goods and excise duties.
 - (d) Grants, administrative fees, fines, etc.

The various sources of mineral revenue summarized in Table 8.4 show that in the period in which production based taxes were used, these accounted for the major part of mineral revenue receipts. Until 1970 production and exports were subject to taxation, the amount paid being set off against company tax liability (18). It will be noted that these "indirect" taxes (i.e., not based on income) accounted for the major part of mineral revenue receipts. These indirect taxes were replaced in 1970 by a mineral tax levied at the rate of 51 per cent on profits gained from copper production (lower on other minerals) with the amount paid being deductible from company tax liability. Since both mineral and company tax were charged on approximately the same base, the decline in the profitability of the mining companies was directly associated with the eventual cessation of mineral revenue receipts. This occurred in spite of the very high marginal rate of tax implied by this new regime: 75.5 per cent with company income tax being charged at 50 per cent .

There is little doubt that the revision of the system of taxation of mineral revenues resulted in a large loss to the government - in the three years prior to 1970 royalties and export tax accounted for an average of 75 per cent of total receipts from the mining companies. However, it is equally clear that a substantial revision would have been required in the light of the collapse of copper prices in 1975, since the industry would have been unable to survive a system of taxation which took little account of profitability (19). Even if royalties and export tax had been retained an adjustment would have had to be made to take account of rising costs.

The loss of mineral revenue was partially redressed by the growth of other types of taxation, but as Table 8.5 shows total current revenue expressed in constant 1970 prices fell at an annual average rate of 1.5 per cent between 1965 and 1979 so that the diversification of the revenue base was not sufficient to make good the entire loss. The data of Table 8.5 relate only to tax revenue received directly from the mining industry based on their production or profits (and does not not even include other tax payments such as sales tax, import duties, or excise duty on bought-in materials and services). Moreover the loss of government revenue from the mining industry does not take account of any decline in tax payments attributable to the economic recession created by the deterioration in the terms of trade. That is, as the "real" price of copper declined, the profitability of many industries also declined, both because foreign exchange constraints created severe shortages of imported inputs, and also because the intermediate demand from the mining industry itself for domestic production fell. Thus the effects of low copper prices extended well beyond the cessation of tax payments from the mining industry, and are clearly seen in the negative growth rates of income taxes and taxes on international trade.

Both Figure 8.2 and Table 8.5 show that the two principal types of taxation which replaced mineral revenue were taxes on income (mainly on personal income and company profits) and taxes on domestic goods and services. Each of these two categories is discussed briefly in the following paragraphs, and the distinction is shown between direct and indirect taxes.

Table 8.5 Trend growth rates (a) of central government revenue aggregates expressed in 1970 prices

	1965-79	1965-70	1970-74	1974-79
Total current revenue	-1.5	15.4	1.5	-13.1
Mineral revenue	-45.9 (c)	10.3 (d)	-3.3	-82.4
Income taxes (b)	8.0 (c)	28.8 (d)	7.9	-3.3
Taxes on international trade	1.7	11.4	-5.3	-6.9
Sales tax	...	...	...	10.8
Excise tax	16.2	35.0	22.3	0.1
Non-tax revenue	-2.7	4.3	-0.7	-9.7
Non-mineral revenue	5.9 (c)	17.2 (d)	6.4	-3.0

Source: Appendix S, Table S.7.4.

- (a) Exponential trend growth rates.
- (b) Excluding income tax paid by the mining industry.
- (c) 1966-79.
- (d) 1966-70.

8.3.2 Direct taxes. These include taxes on personal income and on company profits, together with a rather smaller amount coming from taxation of other types of incomes, such as income from self-employment, and a withholding tax levied on interest, royalties, dividends and similar payments. Also included in this category is the Selective Employment Tax, a payroll tax, introduced in 1975, levied on the salary costs of non-Zambian employees (21).

A simple regression analysis was run on data between 1966 and 1979 using the log-linear model:

$$\ln T = \ln a + b \ln Y$$

where T is income taxes (other than on the mining companies)
Y is non-mining GDP; both expressed in current prices.

This showed a very high income elasticity of direct taxation of 1.5 (22), which reflects a number of features of the tax system: firstly, the introduction of new taxes (such as a selective employment tax); secondly, changes in the rate of taxation on both personal and company taxation; and thirdly, the growth in the numbers (particularly of individuals) who became liable to income tax. This growth was the effect not only of rising employment (which was significant only in the 1960s - see Chapter 2) but also of the fact that (especially in the late 1970s) income tax allowances were not adjusted in line with inflation. This feature, known as fiscal drag, might be regarded as unfair particularly to lower income earners, and certainly was the cause of criticism of the government among the urban population in formal sector employment. But it naturally represented a passive

form of adjustment to the more constrained financial position of the government following the cessation of mineral revenue receipts. It is also worth bearing in mind that although the Zambian tax system may be progressive among income earners, it is regressive among all workers, if in the latter category we include subsistence workers who by definition do not receive a cash income and therefore do not receive the benefit of basic income tax allowances. Indeed the International Labour Office (1977, page 206) suggested that basic personal allowances should be abolished altogether on the grounds that those who benefit from them are the better off members of society taken as a whole.

The high income-elasticity of direct tax receipts may alternatively be expressed as a rising proportion of non-mineral GDP devoted to direct taxation. It is suggested that the high observed elasticity is unlikely to continue in the future. This is confirmed by the behaviour of the ratio of direct tax receipts to non-mineral GDP, which increased rapidly between 1966 and 1973, but thereafter stagnated (23). The high income elasticity may therefore be seen as a result of the monetisation of the economy which slowed considerably after 1974.

8.3.3 Indirect taxes. Even excluding taxes on the production of the mining industry, this category is rather more diverse, including as it does: taxes on domestic goods and services (excise duties, sales tax, etc.) and taxes on international trade (customs duties and sales tax levied on imports), each of which responds to different variables.

Excise duties (on clear and opaque beer, cigarettes, soft drinks, sugar, and petroleum products) were by 1979 the largest single source of tax revenue, and it is the growth of this category more than any other which compensated for the loss of mineral revenue, as Figure 8.1 and the growth rate in Table 8.5 demonstrate. In 1973 a sales tax on certain domestically produced goods was introduced, and this was extended to imported items in 1975, but the yield from this was small relative to excise duties. Excise duty is a specific tax, that is levied on physical volume rather than as a fixed proportion of value; therefore rates must be adjusted frequently when serious inflation exists if the real value of the yield is to be maintained. During the latter part of the 1970s conscious use was made of excise duties to raise additional revenue, since the excisable items were regarded as luxuries or inessentials, or at least were largely consumed by individuals or households with comparatively high incomes (24). There are insufficient data to conduct a systematic study of the incidence of indirect taxes, but it is suggested that they are less regressive in developing countries like Zambia than in the more developed countries where consumption of the taxed items is more widely distributed among all income groups. It is also asserted without supporting evidence (25) that the items subject to indirect taxation had a fairly low price elasticity of demand, and therefore represented a good means for mobilizing additional resources when mineral revenue was no longer available.

That growth in "Taxes on international trade" (see Table 8.6) was positive at all is due to the introduction of sales tax, which augmented the existing system of customs duties. Indeed by 1979 these two taxes on imports were yielding approximately equal amounts. The economic effect of sales tax (imports) is probably neutral, in the sense that it does not discriminate for or against domestic production - it is levied at the same rate on any taxable item, although it is not levied on exactly the same base as sales tax on domestic goods (26). Sales tax (imports) is therefore an appropriate source for raising additional revenue, while customs duty is perhaps now more useful as a means of providing tariff protection for selected domestic industries (27).

8.3.4 Non-tax revenue. A small proportion of total current revenue (typically about 10 per cent) comes from a variety of other sources. These include grants from other governments and international institutions, fines for criminal offences, administrative charges for various government services and interest payments in respect of government loans to other (mainly parastatal) organisations. This source, taken as a whole, declined both in real terms and relative to other sources. One reason is that a large number of organizations were allowed to default on their interest payments, so that collections from this source are often substantially below the budget estimate (28). Another is that many of the charges for government services are not adjusted sufficiently frequently to compensate for the effects of inflation (29).

Table 8.6 Tax extension ratios (a) for selected non-mineral taxes: 1966-79

Type of revenue	1966-79	1966-70	1970-74	1974-79
Personal income tax	1.48	2.15	1.56	1.26
Company income tax	1.50	3.56	0.77	1.12
Customs duty	0.33	1.63	0.17	-0.32
Sales tax (imports)	...	...	...	0.77
Excise duty	2.15	3.18	2.84	1.44
Sales tax (domestic)	...	...	...	2.54
Non-tax revenue	0.45	0.50	0.61	0.41
Total non-mineral revenue	1.37	1.82	1.54	1.12

Sources: Calculated from Appendix S, Tables S.1.1 and S.7.4.

(a) Measured as the ratio between the (exponential trend) growth rates of the tax in question and non-mineral GDP, all expressed in current prices.

8.3.5 Taxation and the national economy. A useful profile of the development of the tax system is given by the use of what is here termed the "tax extension ratio". This ratio is equal to the average growth of tax (or revenue) yields divided by the growth of income, and so provides an indicator of the extent to which tax receipts respond to variations in income (30). The major domestic sources of tax revenue are relatively responsive to changes in the level of income, and this is particularly true of excise duties, which as noted in the previous section are levied on goods with a relatively low price elasticity of demand (e.g., oil products, beer, and cigarettes). Customs duty shows a very low value for this ratio, due to its direct link with the level of imports which declined (in terms of volume during the 1970s - see Chapters 3 and 6).

The ratios for the various periods in respect of total non-mineral revenue suggest that the government's revenue has increased rather more rapidly than non-mineral gross domestic product leading to an increase in the share of the latter taken up by government revenue receipts. Table 8.7 (second column) shows that non-mineral current revenue as a proportion of non-mineral GDP rose fairly rapidly in the 1960s, continuing to increase until 1975, whereafter it remained fairly stable. Thus if the mineral "enclave" is excluded it is quite apparent that the government has imposed a rather heavier burden on the economy as the years have passed, a reaction both to the fall in the revenue yield of the mineral sector and the larger demand for government services and development expenditure. In contrast to the

Table 8.7 Proportionate shares of total and non-mineral revenue in GDP: 1965-79 (a)

	Current revenue as a proportion of total GDP	Non-mineral current revenue as a proportion of non-mineral GDP
1964/65	21.5	...
1965/66	25.5	15.9
1966/67 (b)	30.1	23.2
1968	28.3	19.3
1969	30.2	24.3
1970	33.8	22.2
1971	26.0	21.3
1972	23.4	25.3
1973	24.2	25.8
1974	34.3	26.2
1975	28.3	28.4
1976	22.8	27.0
1977	24.7	27.9
1978	24.3	27.9
1979	23.1	28.6

Source: Appendix S, Tables S.1.1 and S.7.3.

(a) All expressed in current prices.

(b) Eighteen months (06.66 -12.67) reduced pro rata to 12 months equivalent.

behaviour of non-mineral revenue the disappearance of mineral receipts is reflected in the proportionate share of total current revenue in total GDP, which maintained an average of 30 per cent in the five financial years 1966 to 1970, 27 per cent in the following five years, and 23 per cent in the four years 1976 to 1979.

Finally returning to Table 8.6 the decline in the tax extension ratios suggests that the scope for further substantial increases in the relative level of taxation is limited. It should be stressed that these ratios include the effects of changes in the rates at (and in some cases the base on) which the various taxes are levied. In view of the substantial widening of the tax base (e.g., to cover a larger number of individuals in income tax, the increasing use of PAYE, and the introduction of a sales tax) the potential for further increases in revenue yields from this source has become rather more limited. In summary there are essentially two sources of an increase in the real level of government revenue: widening the tax base or increasing rates of taxation, and the growth of output and incomes. The evidence of this section is that the former option has been largely exhausted; and unless more rapid real economic growth is resumed during the 1980s there is little prospect of any real increase in government revenue even if this were warranted on the grounds of the efficient allocation of resources.

8.3.6 An international comparison. The ratio of total current revenue to gross domestic product was calculated for the 40 countries for which data was available from among the random sample of

44 countries first taken in Chapter 7. For the year 1978 it was found that the mean value of this ratio was 23.1 (standard deviation 11.1); the median was somewhat lower - 19.8 (31). Thus Zambia's position does not appear extreme in this regard: in 1978 this ratio registered a value of 24.3 per cent (see Table 8.7), well within the third quartile, as was the average for the entire period 1965-79 (26.7 per cent). This appears to contradict the findings of an earlier study which suggested that for the period 1969-71 Zambia had the highest tax:GDP ratio of the 47 less developed countries covered (32). It should be noted that the present study is not as comprehensive in coverage, particularly insofar as no attempt has been made here to include any time series comparison. The result reached here confirms an earlier conclusion reached in Bell (1981a), and shows that Zambia is by no means atypical with respect to its tax "offtake". Even if the mining sector is excluded from the ratio its value falls within one standard deviation of the sample mean.

Although Zambia may not be atypical in the proportionate share of GDP taken by taxation, there is an interesting variation in the structure of taxation, displayed by the data of Appendix S, Table S.7.11. There are substantial variations among major groups of countries: for instance, the industrial countries place a much greater relative reliance on direct taxes as a source of revenue for the central government, and, because of their commitment to trade liberalization receive very little of their revenue from taxes on international trade. Also the industrial countries and the higher

security with a correspondingly high revenue inflow for this purpose. Zambia appears to be unusual among developing countries in a fairly high share of revenue derived from direct taxes (a feature shared by the "average" African country), a significantly greater reliance on the taxation of domestic production, and, for an open economy a surprisingly low yield from taxes on international trade (33). This last feature is due to three characteristics of the Zambia economy: firstly, the large fall in the real value of imports discussed repeatedly in earlier chapters; secondly, the switch away from luxury (highly taxed) imports associated with the rigorous control of imports; and, thirdly, the complete absence from the Zambian portfolio of fiscal policy of any export taxes after 1970. The relatively high figure for taxes on income and profits is particularly significant insofar as it does not include any income from the mining sector (there was none in that year) and in a more "normal" year with revenue from this source its proportionate share would be rather higher.

8.4 Government Expenditure

8.4.1 Cross-country patterns of expenditure. The two perspectives on government expenditure patterns permitted by Appendix S, Tables S.7.12 and S.7.13 show that Zambia departs from the "average" for non-oil developing countries in only a relatively few characteristics. One of the more interesting features is that in 1978 Zambia's recurrent expenditure represented a smaller proportion of total expenditure and net lending (64 per cent) than any of the three major country groupings (industrial, oil exporting and non-oil developing).

However this variation is not so pronounced in the case of the lower income groups of countries, particularly those in Africa and Asia. It will shortly be observed that this characteristic of the Zambian economy was a temporary aberration created by the exceptionally high level of net lending (principally to parastatal organisations) in that year. Thus by comparison with most developing countries Zambia devoted a rather small proportion of total expenditure to capital formation, for reasons discussed shortly.

A further comparative feature which is of particular interest is that the relative level of "subsidies and other transfers" was significantly lower in Zambia than the average for the major country groups. Two characteristics may account for variations in this broad category of expenditure (particularly between developed and developing countries): one is the greater concentration of state functions in developing countries in the central government, so that transfers between levels of government would be rather less important; and the other is the far more extensive social security systems in the developed countries which result in very large transfer payments between the government and the private sectors. It is certainly true that Zambia has a fairly rudimentary social security system (34) and direct grants to other levels of government (the local authorities) are strictly limited. Moreover time series data (see Tables 8.9 and 8.10) show that the level of subsidisation in 1978 was exceptionally low relative to adjacent years. Thus, although subsidies may be understated vis-à-vis other countries it is a reasonable conclusion that

Zambia was apparently not unusual in having an unduly high level of subsidisation in 1978.

In most other respects patterns of expenditure do not vary to any extraordinary extent: education accounts for a somewhat larger proportion than in most countries, and so too (apparently) does agriculture. In the latter case this is because consumer price subsidies on agricultural commodities are included. Thus the larger expenditure cannot be expected to have an appreciable economic impact. The category "Other" expenditure includes (in the case of Zambia) defense spending, thus accounting for the rather larger proportion taken by this residual category. It is estimated that in 1978 the proportion of expenditure devoted to defense by Zambia was of the order of 16 per cent (35), which while rather higher than the average for African countries is considerably less than is common in other politically and militarily unstable regions such as the Middle East.

8.4.2 The relationship between expenditure and revenue. The extent to which government saving in Zambia declined during the 1970s was reviewed in Section 8.2. Further elaboration of the implications of the cessation of mineral revenue inflows to the government is presented by Table 8.8. If current revenue exceeds (i.e., is more than 100 per cent of) current expenditure, then the government is a net saver, a state which existed in each year from independence until 1970. Indeed so strong was the government's financial position in this period that current revenue was sufficient in several years to cover all expenditure (36), as the first column in Table 8.8 shows.

Table 8.8 Relationship between expenditure and revenue aggregate:
1964/65 to 1981

(Percentages)

	Current revenue ÷ total expenditure (a)	Current revenue ÷ current expenditure	Non-mineral current revenue ÷ current expenditure
1964/65	123.4	155.9	...
1965/66	116.2	168.5	58.8
1966/67	95.0	148.4	60.8
1968	75.6	143.2	60.8
1969	108.8	177.3	73.3
1970	101.3	167.0	70.0
1971	60.4	94.4	59.6
1972	65.9	94.7	79.0
1973	52.4	104.1	75.0
1974	112.8	160.1	82.5
1975	55.7	81.9	71.1
1976	49.4	78.8	76.7
1977	62.8	83.8	84.0
1978	61.1	94.8	94.8
1979	69.4	82.1	83.4
1980	56.8	75.3	71.2
1981 (budget- revised)	65.1	80.1	80.0

Source: Calculated from Appendix S, table S.7.1.

(a) Includes net lending.

Thereafter, with the exception of 1973 and 1974, the government became a net dissaver (that is on current account), to the extent that the excess of current expenditure over current revenue showed a mean value of 16 per cent between 1975 and 1979 inclusive.

One of the objectives which is believed to have been discussed within the government is to reach a situation in which current expenditure is permanently covered by non-mineral current revenue. The final column of Table 8.8 shows that although some progress has been made in this direction since the 1960s, there is still a substantial amount remaining to be done. It is suggested that this is probably an unrealistic target for short-term policy, in that the contractionary impact on domestic demand of reducing government expenditure or raising taxation sufficiently to achieve this would be counter-productive; that is the multiplier effects of lower expenditure or higher taxation on domestic production and incomes could well result in a further loss of non-mineral tax revenue. As was seen in Section 8.3 the "tax-extension" ratios of taxes on domestic economic activity are sufficiently high to believe that if further economic growth can be generated then non-mineral taxes will eventually be sufficient to cover current expenditure at least. Nevertheless this particular series serves to emphasize the extent to which the government's expenditure is dependent on mining revenue.

8.4.3 The evolving structure of government expenditure.

Tables 8.9 and 8.10 allow the effects of the decline in revenue (in constant prices) on government expenditure to be perceived. If the

Table 8.9 Composition of government expenditure by economic type

(As percentage of total expenditure) (a)

	1964/65	1969	1974	1975	1976	1977	1978	1979	1980	1981(d)
"Normal" current expenditure (b)	...	...	51.7	47.2	46.8	55.3	47.7	62.4	57.9	67.1
of which: Personal emoluments	24.3	16.3	16.5	13.7	15.0	17.3	15.9	17.6	14.6	20.5
Goods and services	19.2	17.2	15.8	13.0	13.3	15.1	12.8	16.6	13.8	17.0
Subsidies		5.5	7.8	9.5	6.3	7.7	4.4	10.9	14.7	10.7
Grants and other special expenditure	14.3			3.7	4.0	4.2	3.5	4.0	4.3	5.4
Debt interest		7.7	6.5	4.9	6.4	8.9	9.3	10.6	9.0	11.7
Other constitutional and statutory (c) (excluding debt amortization)	12.0	11.8	14.6	15.9	13.1	13.9	12.2	16.9	13.9	7.5
Total current expenditure	76.2	59.6	66.3	63.1	59.9	69.2	60.0	79.3	71.8	74.6
Non-current expenditure	23.8	40.4	33.7	36.9	40.1	30.8	40.0	20.7	28.2	25.4
Capital expenditure	13.8	26.8	18.5	15.1	12.9	13.3	9.5	9.1	8.7	12.8
Net lending	5.4	10.9	9.4	14.6	22.3	9.8	23.6	4.4	15.1	4.8
Debt amortization	4.6	2.7	5.8	7.2	4.9	7.6	6.9	7.1	4.4	7.7
Total expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from Appendix S, Table S.7.5.

- (a) Including net lending.
- (b) That is expenditure subject to parliamentary approval (excluding constitutional and statutory).
- (c) As presented here this is mainly defence.
- (d) Budget estimates.

Table 8.10 Average annual growth rates (a) of government expenditure by economic type (b)

(Percentages)

	1964/65 to 1969	1969 to 1975	1975 to 1979	1964/65 to 1979
Nominal recurrent expenditure	...	...	-5.9	...
of which: Personal emoluments	7.7	3.6	-6.6	2.1
Goods and services	14.1	1.7	-6.7	3.3
Subsidies	14.6	16.9	-9.4	4.8
Grants, special and other expenditure		-5.7	-7.2	
Debt interest		6.4		
} 16.3	17.2		10.3	
Other constitutional and statutory expenditure			-11.0	
<u>Total recurrent expenditure</u>	11.1	7.6	-7.1	4.6
<u>Non-current expenditure</u>	29.6	5.0	-24.1	3.3
Capital expenditure	33.3	-3.1	-22.6	1.5
Net lending	34.1	11.9	-34.9	2.9
Debt amortization	4.7	25.6	-12.5	7.3
Total expenditure	16.7	6.6	-12.2	4.3

Source: Calculated from Appendix S, Table S.7.6.

- (a) Geometric mean growth rate.
 (b) Expressed in 1970 prices.

simple balance between current and non-current expenditure is considered it would appear that there was virtually no appreciable change in the balance between the two categories during the years after 1974 when mineral revenue started to dry up, although there was a significant variation from year to year. Closer examination of the components of non-current expenditure reveals that capital expenditure (37) declined sharply and fairly steadily from 1969 onwards, while net lending (38) was the source of a growing yet erratic demand on the budget. If net lending is removed from the calculations then the trends involving current and non-current expenditure become clearer, as Table 8.11 shows. The decline in the share of capital expenditure has been substantial and persistent through the 1970s with a fall from about one-third of the total at the peak in 1968 to little more than one tenth in 1979.

This examination of the structural composition of expenditure suggests that current expenditure has increased at the expense of capital expenditure. A more accurate interpretation involves reference to Table 8.10 which reveals that current expenditure simply fell less dramatically than the other principal aggregates (39). Inevitably, when governments face such severe crises as Zambia suffered, it is the capital budget which is first reduced. Although it could be argued that governments thereby reduce their development potential it is undoubtedly a rational response, particularly when there exists a serious import constraint. Thus in successive budget statements the Ministers of Finance were to argue such a case; for instance the following passage from the 1978 Budget Address:

Table 8.11 Trends on current and capital expenditure
(excluding net lending)

(Expressed as percentages of total expenditure less net lending)

	Current Expenditure	Capital Expenditure
1964/65	84.1	15.9
1965/66	74.2	25.8
1966/67	75.0	25.0
1968	67.4	32.3
1969	69.1	30.9
1970	72.6	27.3
1971	68.5	31.5
1972	76.1	23.9
1973	79.1	20.8
1974	78.2	21.8
1975	80.7	19.3
1976	82.1	17.9
1977	83.9	16.1
1978	86.4	13.6
1979	89.1	10.9
1980	89.3	10.6

Source: Calculated from Appendix S, Table S.7.1.

"It is only through capital expenditure that we can add to the productive capacity of the economy. However, even if we were to allocate massive amounts of financial resources for capital expenditure this year it would not be possible to utilize all these funds. Firstly, capital expenditure inevitably entails recurrent expenditure. Since our recurrent expenditure has been heavily restrained so as to provide only the most essential services, Government is not in a position to support substantial new projects. Secondly, we continue to face an acute foreign exchange shortage. This will restrict our ability to use capital funds, since a large proportion of our capital goods are imported." (40)

Thus it is found that every component of the government budget was very substantially reduced after 1975 with but one exception: debt interest and this rose in response to the very rapid rise in domestic short-term borrowing to finance the deficits of the late 1970s. In view of the instability associated with first a very rapid growth of most expenditure aggregates followed by an almost equally sharp decline, it is of considerable interest that most components of recurrent expenditure (i.e., by economic type) retained a fairly constant proportionate share of total expenditure. Thus it could not be suggested that the government was experiencing difficulties because a disproportionate growth of any particular component of its expenditure. The one exception is the category "subsidies" which was very variable but increased markedly between 1969 and 1980. The reasons for the growth of subsidies are closely linked to the behaviour of "net lending" and brief attention is now turned to this aspect of the government budget.

8.4.4 The effects of the parastatal sector. The parastatal sector (41) is given government support by four principal methods: subsidies intended to reduce consumer prices or to provide production incentives; short-term loans ostensibly to provide temporary support for companies experiencing liquidity problems; long-term loans and direct equity investment to finance development expenditure; and direct grants for investment projects which would not meet the full requirements of commercial viability. Subsidies are directed to these organisations through the current budget, while long-term loans, equity investment and capital grants form part of the capital budget, and all of these require prior parliamentary approval. "Short-term loans" cover any lending of up to twelve months maturity (42) and do not require approval by Parliament. Of the four main categories of budgetary support, no further attention is given to direct capital grants which may be presumed to have followed similar trends as the rest of direct government capital expenditure.

The principal part of the government's subsidy payments are made to one parastatal organisation - the National Agricultural Marketing Board (Namboard) - which for a number of years was granted a monopoly position in the distribution of most agricultural inputs and in the marketing of several agricultural products (in particular, maize). For this reason Namboard's problems represent a useful, if extreme, example of the problems afflicting the parastatal sector and it is taken as a case study. Table 8.12 contains details of subsidy payments made in the period 1971 to 1981.

Table 8.12 Government expenditure on subsidies by principal recipient: 1971-78

(Million kwacha)

	Namboard (a)				Tobacco Board	Other (c)	Total
	Maize (d)	Fertilizer (d)	Other (e)	Cooperative Unions (b)			
1971	14.4	0.5	0.6	...	1.1	...	...
1972	8.3	3.7	9.1	...	0.8	...	...
1973	21.1	2.7	1.9	0.6	0.8	...	...
1974	14.0	8.4	0.4	4.3	2.9	17.4	47.4
1975	19.8	32.9	0.7	3.2	1.0	25.2	82.8
1976	22.0	22.1	5.6	4.0	1.8	4.2	59.8
1977	26.4	17.6	7.7	8.0	2.3	4.2	66.2
1978	18.0	12.2	--	5.4	4.5	2.0	42.1
1979	12.0	6.3	71.8	5.1	3.4	6.7	105.3
1980 (revised budget)	103.8	43.4	23.8	11.5	15.6	10.5	208.6
1981 (budget)	39.9	17.9	--	24.8	11.8	10.3	124.7

Sources: For years 1971 to 1979: Republic of Zambia, Financial Reports, 1971 to 1979, Lusaka: Government Printer.

For years 1980 and 1981: Republic of Zambia, Estimates of Revenue and Expenditure 1981, Lusaka: Government Printer.

(a) National Agricultural Marketing Board.

(b) These were provincial marketing cooperatives, given limited exemption from Namboard's marketing monopoly. Almost all the subsidies in this category are in respect of maize handling and price differential.

(c) Includes all other agricultural industrial, housing subsidies, etc.

(d) Both maize and fertilizer subsidies were paid for most of this period in respect of "handling costs" and "price differentials". Since the effect of both was to lower the purchasers' price no distinction is made herein.

(e) Includes in some years (especially 1972, 1976, 1977, 1979 and 1980) subsidies paid to cover operational losses of Namboard. The 1979 and 1980 figures cover deficits incurred in the years 1977-79.

The subsidies received by Namboard have three principal purposes: firstly, to reduce the consumer price of maize meal (the staple food of most regions of Zambia), secondly, to reduce the cost of fertilizer to the producer, and thirdly, to cover the operational deficits which became a persistent feature of the late 1970s. Although the last of these three is formally distinguished from the other subsidies, it almost certainly can be regarded as an additional subsidy payment in respect of consumer prices for maize and fertilizer. This is particularly true of the very substantial "other" subsidies paid to Namboard in 1979 and 1980 (for losses made between 1977 and 1979), which may be attributed to two main factors. One of these was the need to import maize to cover serious production shortfalls in 1978 and subsequent years, at prices well in excess of the domestic producer prices which formed the basis of subsidy calculations.

The second factor was that, although the government was publicly committed both to the reduction of all forms of subsidies and to the increase of agricultural producer prices, it appeared to be unwilling to accept the inevitable consequence, that is an increase in the consumer price of maize. For example, in 1975, Kaunda announced that subsidies to parastatals were to be cut by up to 60 per cent (43), and indeed by 1978 total subsidies had been cut by nearly 50 per cent in nominal terms from their 1975 level, and, as Table 8.12 shows, by a much larger proportion in real terms. However, closer examination of Table 8.12 shows that the reductions fell least heavily on consumer subsidies and that it was the subsidies to other sectors of the economy which were most severely reduced. This pattern was reflected

in the movements of the producer and consumer prices of maize shown in Table 8.13, where it is found that the guaranteed producer price was increased by 214 per cent between 1972 and 1980, whereas the price of "breakfast meal" was increased by only 108 per cent, that is about one half of the increase in producer price. The increase in the price of the less highly refined "roller meal" (the type purchased by lower income groups) was significantly more (155 per cent) though still considerably less than the increase in the producer price. The different increases in the prices of the two types of maize meal reveal much about the priorities of the government and the ruling party - they were apparently more concerned to restrain the cost of the maize meal which was purchased by higher and middle income households which (more or less by definition) were concentrated in the urban areas and therefore constituted a more potent political force.

This may unduly impugn the motives of the government since the author's estimates of the production costs (last two columns of Table 8.13) show that roller meal was seriously underpriced throughout the period preceding the increase, and the price rise could be regarded as restoring the balance between price and cost. Thus we find that the "material" cost component of roller meal exceeded the consumer price as far back as 1975, whereas it was not until 1979 that this occurred with respect to breakfast meal. This material price component represents the "farmgate" price of maize paid by Namboard; to this must be added collection, storage, milling, packaging, marketing, distribution and overhead costs. Data are not available to permit a full analysis of the problem, but it is possible

Table 8.13 Maize - prices and costs: 1972-80

(Kwacha)

	Consumer prices (a)		Producer price (b)	Material cost (c)	
	Breakfast meal	Roller meal		Breakfast meal (d)(f)	Roller meal (e)(f)
1970	...	...	3.50	...	...
1971	...	...	4.00	...	...
1972	4.32	3.10	4.30	3.35	2.81
1973	4.32	3.10	4.30	3.35	2.81
1974	4.32	3.10	4.30	3.35	2.81
1975	4.32	3.10	5.00	3.89	3.27
1976	7.75	3.80	6.30	4.90	4.12
1977	7.70	3.86	6.80	5.29	4.45
1978	9.60	4.66	9.00	7.00	5.88
1979	9.00	6.28	11.70	9.10	7.64
1980	9.00	7.90	13.50	10.50	8.82

Sources: Consumer prices: Republic of Zambia, Monthly Digest of Statistics, Lusaka: Central Statistical Office, April/September 1980 (Table 64).

Producer prices: Bank of Zambia, Report and Statement of Accounts 1976 and 1980, Lusaka: Bank of Zambia (Table 3.2 in each edition).

Material cost: author's estimates.

(a) Kwacha per 50 kg bag (retail).

(b) Kwacha per 90 kg bag.

(c) Cost of maize only - excluding all costs of transportation, processing, distribution, etc.

(d) Based on an extraction rate of 60 per cent.

(e) Based on an extraction rate of 85 per cent.

(f) Converted to kwacha per 50 kg for direct comparison with consumer prices.

to conclude that the government's effective policy position by 1979 was completely untenable. The options available to improve Namboard's financial position were: either to raise consumer prices very substantially or to raise subsidies. The evidence of Tables 8.12 and 8.13 for 1980 and 1981 is that the latter course of action was chosen. If the consumer prices were raised in order to restore the mark-up over the producer price available on breakfast meal in 1972 (and to apply it to roller meal as well) (44) then it would be necessary to raise the price of roller meal and breakfast meal by 44 per cent and 50 per cent respectively over their 1980 levels assuming that producer prices remained unchanged.

In short, the critical financial situation in which Namboard was placed by the late 1970s was a consequence of contradictory government policies: rapidly rising producer prices, inadequate increases in consumer prices and attempts to reduce subsidies, in an organisation which by virtue of its monopoly position in many agricultural products (another government policy) was not exposed to any domestic competition and was therefore prone to inefficiency at all levels of operation. Similarly there was no threat of competition from imports since price control meant that domestic producer prices were far below border prices for most commodities. Moreover even if border prices had been more competitive, it is exceedingly unlikely that any importer would have been able to acquire import licenses or foreign exchange allocations for such purchases.

Although it has been stressed that Namboard's case was extreme, it is by no means atypical of the problems facing many other parastatal industries where price control, import restrictions and rising costs of production served to reduce output and to erode profit margins. Thus most industries were unable to finance development from internal sources, and many faced acute liquidity problems with some incurring losses in various years. For instance in the financial year 1978/79 the manufacturing group of companies of the Zambia Industrial and Mining Corporation (ZIMCO) recorded a post-tax loss of 3.3 per cent, and 3.0 per cent in the following year. This group probably represents the major part of Zambian manufacturing industry, and serves as a useful barometer of conditions in the modern sector of the economy (45). The creditworthiness of these organisations was generally too poor to raise loans from foreign sources (and increasingly domestic sources also) without government guarantees, and the commercial banks eventually became severely constrained by the 1978-80 IMF programme, in which strict ceilings were placed on domestic credit expansion. The government, therefore, increasingly became a last resort for industries seeking finance merely to continue operations. The most striking example of this was the mining industry whose financial crisis was discussed in some detail in Chapter 6.

Table 8.14 shows the growth of government financial assistance to and participation in providing finance to other sectors of the economy, and an examination of the original sources of the data shows that the overwhelming majority of this financial assistance was provided to the parastatal sector. The conscious decision by

Table 8.14 Government lending, investment and guarantees:
Amounts outstanding, 1967-80 (a)

(Million kwacha)

	Equity Investment (b)	Direct loans	Guarantees of loans to non-government entities		Short-term lending	
			Domestic	Foreign	Total of which:	Namboard (c) Mines
1967	16.9	233.2	12.2	86.3	23.3	...
1968	31.5	307.5	5.7	67.2	25.4	...
1969	49.5	349.7	8.6	92.2	23.3	...
1970	113.9	358.9	17.3	340.8	17.5	15.0
1971	127.3	380.3	18.2	256.7	25.3	22.0
1972	130.9	420.0	30.1	262.4	22.7	19.7
1973	297.6	533.8	40.1	82.7	10.6	7.6
1974	318.2	559.5	51.1	99.3	18.6	6.4
1975	443.0	539.2	31.5	297.4	44.3	12.5
1976	453.1	726.4	47.6	437.3	59.8	40.1
1977	466.8	756.9	53.5	422.5	105.1	72.8
1978	492.6	801.6	76.3	463.1	265.3	69.6
1979	541.1	815.3	115.1	486.4	245.5	57.8
1980	793.1	974.2	111.4	539.3	20.5	7.9

Source: Government of Zambia, Financial Reports (1966/67 to 1979), Lusaka: Government Printer
(Statement L, Appendices 1, 3 and 4 in 1979 Report).

- (a) Balance at 31 December in each year.
- (b) Includes a small amount in respect of capital subscriptions to international organisations.
- (c) National Agricultural Marketing Board.

the government to increase the degree of state participation shows up in a thirty-fold increase in equity investment, obviously influenced greatly by the partial nationalization of the mining industry in 1970. This exercise also explains the apparent "kinks" in the series for external guarantees and equity investment in the period 1970-73. Ownership was originally vested in ZIMCO (not in the government directly) with the government providing guarantees to the holders of the ZIMCO bonds which were issued to finance the takeover in 1970. When the government decided to take full control in 1973 it took direct equity control from the holding company ZIMCO (47). After 1973 the growth of direct equity investment was relatively small, and mainly consisted of small increases in participation of companies previously owned by the state, frequently by means of the capitalisation of outstanding loans which the companies were unable to repay. The category "long-term loans" frequently constitute the medium by which Zambian parastatal organisations borrow from external agencies. This was the case with loans of about K85 million from the World Bank and other lenders for the construction of electricity generating capacity at Kafue Dam by the Zambia Electricity Supply Corporation in 1973, and the assistance extended by the Chinese government for the construction of the Tanzania-Zambia railway for the operation of which a parastatal company was established. Even excluding such major projects the volume of loans outstanding has shown a persistent increase, so that by 1979 the balance was about 3.5 times that at the end of 1967. The passive support extended by the government in the form of guarantees on borrowing from other sources rose substantially after

1975, the main reason being heavy foreign borrowing by the mining companies in the early stages of their financial difficulties.

It was noted at the start of this sub-section that equity investment and long-term lending were both subject to prior parliamentary approval; it is also the case that the volume of guarantees which may be covered is limited by Act of Parliament. This is not the case with respect to short-term lending, shown in the right hand part of Table 8.14. It is believed that the original intention of the facility for short-term lending was to provide support for organisations which by the nature of their operations required large amounts of cheap credit in order to finance purchases in advance of sales. This would have been particularly true of agricultural institutions (like Namboard) which would typically have to buy an entire season's crop in the space of a month or so, and would then have had to bear the cost of storing this for the rest of the year with only a relatively small steady income as the stocks bought in were gradually depleted. Thus in the space of a year a facility granted to finance this operation should be completely repaid. In principle it should be possible to finance such a system by means of a revolving fund, with the possibility of "topping up" to take account of the effects of inflation and increasing production. It is clear from the variability of the outstanding balances and the rapid increase in this balance that this intention was not fulfilled.

In the years after 1975 when subsidies were initially reduced and consumer and producer prices were moving out of line with respect

to one another (see above) this account would appear to have become a more permanent source of finance for a number of parastatal organisations, most notably Namboard in 1978 and 1979 the mining companies. The short-term lending to the mines was eliminated in 1980 by conversion of their liability to long-term loans and equity. Thus it is found that the short-term lending account became the source of a substantial volume of extra-budgetary expenditure, which did not enter the annual forecasting exercise leading up to the Budget, but which nevertheless had an immediate impact on the government's borrowing requirement. This account therefore represented a loophole in the system of restrictions on domestic credit expansion introduced as part of the 1978-80 IMF programme, and indeed a very attractive one to the borrowers since many of the loans were extended free of any interest charges. Not only did this represent an avoidance of the credit restriction, but it was potentially the most inflationary means of doing so. Instead of going to the commercial banking system, as would be the normal course for an industrial company, this borrowing was effectively being financed by the central bank (by means of a larger short-term borrowing requirement on the part of the government which was then financed almost entirely by the Bank of Zambia) (48). Any attempt to impose stricter budgetary control should therefore focus on the short-term lending account as one of the prime areas of control - possibly by setting tight limits on the amount by which lending from the account might increase during the course of any period of twelve months.

8.4.5 Expenditure by function. Although it was noted in Section 8.4.3 that no single component of government expenditure (by economic type) had been responsible for the growth of the central government borrowing requirement, it is clear that the decline in the real value of most types of expenditure after 1975 (see Table 8.10) inevitably served to retard economic development. Evidence of this comes in Table 8.15 which classifies total expenditure by function (excluding net lending), and shows considerable variation among the various categories (49). With the exception of "Other" expenditure, which is presumed to consist principally of debt service payments, all the main categories showed decline. Thus expenditure on long-term development such as education suffered a reduction which was larger than average, and consequently a decline in its proportionate share of total expenditure. Economic services, too, were substantially reduced, particularly those relating to infrastructural development (energy, water, transport, and communications), a result of the completion during the period of several major projects (50), but an indication also that the authorities were unable to initiate further such investment expenditure. By contrast expenditure on "general public services" fell by rather less than the average; an alternative interpretation is that the claims of the armed forces, administrative and central (coordinating) ministries rose relative to those of those providing economic services because of expanding bureaucracy and a proliferation of governmental organisations.

Table 8.15 Composition of government expenditure by function: 1972-78

(Percentages of total expenditure) (a)

	1972	1973	1974	1975	1976	1977	1978	Trend Growth rate (b) 1972-78
General public services (c) (d)	36	36	39	48	41	40	39	-2.1
Education	19	20	19	14	17	17	17	-7.0
Health	7	6	6	6	7	7	8	-0.8
Economic services	27	25	24	20	19	20	18	-10.0
of which: Agriculture (c)	(4)	(4)	(3)	(4)	(4)	(5)	(6)	1.6
Mining, manufacturing, and construction	(1)	(2)	(1)	(2)	(2)	(4)	(4)	16.1
Electricity and water	(4)	(2)	(1)	(2)	(2)	(1)	(1)	-19.3
Transport and communications	(11)	(11)	(11)	(9)	(8)	(9)	(7)	-11.2
Other (e)	11	13	13	12	16	16	18	3.6
Total expenditure	100	100	100	100	100	100	100	-4.0

Source: Calculated from International Monetary Fund, Government Finance Statistics Yearbook, 1981
Washington: International Monetary Fund.

(a) Excluding "net lending".

(b) See Appendix III.3. Based on series deflated by index of domestic final expenditure.

(c) The figures shown in the IMF's GFS Yearbook following Zambian practice include subsidies on maize and fertilizer under "General Public Services" up to 1976 and under "Agriculture" from 1977. The figures have been adjusted, transferring subsidies out of the latter to the former in 1977 and 1978.

(d) Includes defence.

(e) Probably consists largely of debt service payments.

Although expenditure on agriculture increased, the gain was small - certainly less than the rate of population growth - and the proportion of the total government budget devoted to this purpose remains very low, especially when it is recognized that the government represents one of the few channels for providing financial and other forms of support for the development of this sector. Development expenditure would take the form not only of direct capital investment, but of the numerous services which are provided by the various ministries (pest eradication, marketing, surveying, agricultural research and extension services to name but a few). There can also be little doubt that the quality of government services deteriorated during the latter part of the 1970s in both urban and rural areas due to the financial constraints on expenditure plans for both current and investment purposes. That this is so needs no more elaboration than to note again an example that the average annual rate of contraction of expenditure on education (expressed in constant prices) between 1972-78 was 7 per cent. If the expansion of population is taken into account then per capita education expenditure fell by an average of over 10 per cent annually during this period.

8.5 "The Disappearing Budget"

The title of this section is borrowed from Caiden and Wildavsky (1974) (51), who, in describing the problems of budgeting in less developed countries in general could hardly have provided a more accurate summary of the Zambian government's experience in the increasingly constrained financial situation of the late 1970s and early 1980s. These authors describe the way in which governments

(or more accurately Ministries of Finance) hedge against uncertainty by adopting conservative procedures of estimation, and adopt what they term "repetitive budgeting", that is establish procedures of control in which proposed expenditure by government departments has to pass through two or more processes of approval by the finance ministry. Moreover, they note that recurrent expenditures tend to take up the major part of budgets, for the simple reason that investment projects undertaken in the past come to place demands for current expenditure in subsequent years, a phenomenon which was observed in Section 8.4.3. In this section two related issues are taken up: firstly, the extent to which the availability of resources to the Zambian government governs the level of expenditure; and secondly, the ease of forecasting revenue and expenditure in an environment in which the principal source of revenue is both unstable and subsequently disappears altogether.

In Section 8.4.2 it was found that in the late 1960s current revenue was sufficient to cover all current (and in some years total) expenditure, but that in the subsequent decade such a situation became exceptional. It also became apparent that Zambia resorted increasingly to loan financing, so that the effective restraint on the government's ability to undertake expenditure was total revenue (defined to include tax and non-tax current revenue plus the proceeds of medium- and long-term borrowing). A further phenomenon, which appeared in extreme form in 1974 and 1975, was that there was a tendency for the government to tailor its expenditure plans to the resource position in the preceding year. Thus in 1973 and 1974 revenue receipts were very high

but it was not until 1975 that expenditure was increased very substantially in a high expansionary (inflationary) budget. An opposite case occurred in 1968 and 1969 when in the first year revenue was low and in 1969 a deflationary budget was adopted; revenue in that year was the highest (expressed in constant prices) that Zambia experienced after independence.

The hypotheses suggested by these remarks were more formally explored in the form of simple regressions of expenditure variables (current and total), on two measures of revenue (also current and total) firstly observations of each variable taken from the same year, and then with the revenue variable lagged by one year. The results are summarized in Table 8.16. In the case of the unlagged relationships only the regression of total expenditure on total revenue (i.e., including a loan financing) provided a statistically significant result. The consistently stronger relationships between expenditure and lagged revenue suggests that decision making was heavily influenced by economic performance in the recent past. Moreover the fact that only a relatively weak correlation is found between expenditure and current revenue suggests that the latter does not provide a dominating constraint on government expenditure. The slope coefficient provides a direct measure of the elasticity of expenditure with respect to revenue and in all cases this elasticity is significantly less than one; that is although expenditure does respond to variations in resource availability, it does so less than equiproportionally.

Table 8.16 Association between expenditure and revenue aggregates: 1964/65 to 1979 (a)

(Regression coefficients)

Dependent Variable	Independent Variable	Intercept	Slope	R ²	F
I. Unlagged relationship (n = 15)					
Current expenditure	Current revenue	47.83	0.2930 (1.106)	0.0860	1.22 (e)
Total expenditure (d)	Current revenue	13.23	0.5879 (2.106)	0.2543	4.43 (e)
Total expenditure (d)	Total revenue (c)	5.10	0.7398 (3.115)	0.4274	9.70
II. Lagged relationship (b) (n = 14)					
Current expenditure	Current revenue	19.06	0.4604 (2.556)	0.3526	6.53
Total expenditure (d)	Current revenue	11.56	0.6191 (3.816)	0.5483	14.56
Total expenditure (d)	Total revenue (c)	12.07	0.5999 (4.210)	0.5963	17.73

Source: Calculated from Appendix S, Table S.7.2.

Notes: (figures in brackets are t-ratios)

(a) Based on log-linear relationships, i.e., $Y = a X^b$.

(b) Independent variable lagged by one year.

(c) Includes net receipts from borrowing (domestic and foreign).

(d) Includes net lending.

(e) Not significant at 5 per cent level. Critical value of F = 4.67 (1 and 13 degrees of freedom).

The proposition that expenditure decisions may be taken on the basis of past revenue performance is given some credence by the fact that no formal forecasting models are used in the estimation of budget aggregates. In such a situation it is perhaps not surprising that budgets are compiled on the basis of extrapolation of past trends and inter-ministerial negotiation for expenditure allocation. Thus it is of interest to examine the accuracy of government forecasts, and to establish whether the tendency, noted by Caiden and Wildavsky, for governments of less developed countries to adopt conservative estimates, has occurred in Zambia. Jolly and Williams (1972) produce evidence that there was indeed such a pattern in the years from 1957/58 to 1970. The data of Table 8.17 support the conclusions of Jolly and Williams, and also show that the pattern continued largely unchanged throughout the 1970s.

The series in Table 8.17 show the actual values of the various aggregates expressed as percentages of the respective annual budget forecasts. A ratio in excess of 100 per cent indicates an underestimate; thus the overwhelming impression is one of financial conservatism with all aggregates consistently underestimated. The degree of underestimation declined, though only slightly, in the 1970s; the largest change occurred in respect of total revenue, and this is largely explained as a result of the government's failure to foresee the severity of decline of mineral revenue. Closer examination of the figures suggests a further change. Consider the ratio of the accuracy of total expenditure forecast to the accuracy of the total revenue forecast. If this is less than 100 per cent then the

Table 8.17 Accuracy of revenue and expenditure forecasts

(Actual as a percentage of budget forecast)

	Total revenue (a)(b)	Non-mineral current revenue (a)	Total expenditure(a)	Current expenditure(b)
1964/65	143	...	111	114
1965/66	130	120	116	112
1966/67	109	126	101	117
1968	103	112	115	115
1969	126	115	117	117
1970	142	114	126	113
1971	110	135	110	106
1972	131	117	122	122
1973	156	114	149	110
1974	160	129	107	101
1975	96	110	113	118
1976	96	104	111	113
1977	100	107	104	104
1978	98	104	103	99
1979	110	112	113	109
Average:				
1964/65				
to 1970	127.7	117.5	114.2	114.5
Average:				
1971 to				
1979	114.1	114.5	114.5	109.3

Source: Calculated from Republic of Zambia, Financial Reports, 1965-79, Lusaka: Government Printer.

(a) Aggregates may differ from these in other tables since data derived directly from Financial Reports on Zambian government definitions.

(b) Includes capital financing - loan floatations, grants, etc. - expressed gross, i.e., without deduction of debt repayment.

situation described is one in which a "safety margin" exists: that is actual expenditure exceeded the forecast by less than actual revenue exceeded its forecasts. Conversely if this ratio is greater than 100 per cent then the degree of financial conservatism is less. In the period 1964/65 to 1970 the ratio averaged 89 per cent; after 1970 the average was just over 100 per cent, and in the years from 1975 the ratio was substantially above 100 per cent (average 109 per cent). Thus although expenditure forecasting became slightly more accurate during the 1970s, revenue deviated even less from the annual estimates than did expenditure, with the result that the government had to attempt to introduce increasingly tight controls on actual expenditure.

This last feature led to the intensification of Caiden and Wildavsky's "repetitive budgeting" (1974, pp 71-78). Before 1974 all ministries had direct access to the government's main account at the Bank of Zambia, and it was therefore possible for ministries to "overdraw", that is to exceed their approved expenditure allocation. The "partial exchequer" system introduced in 1974 meant that ministries no longer had access to the main account, but operated through subsidiary accounts to which disbursements of expenditure would be made by the finance ministry in accordance with the budget allocation (52). There is evidence in Table 8.17 of some success for this measure in that from 1974 the "accuracy" of total expenditure estimates improved, although supplementary budgets continued to push up actual expenditure. However in the constrained circumstances of the late 1970s the government perceived a need for greater control over disbursements from the main accounts; this became particularly evident in the context of the

1978-80 IMF programme when tight controls on new credit to the government necessitated the adoption of even greater scrutiny over expenditure on a quarterly and monthly basis rather than the less clearly defined periods within the financial year (53). Thus in addition to examining a ministry's request to determine whether it was permissible under that ministry's allocation, the finance ministry disbursed funds only if the total expenditure during a given quarter did not exceed the balance in the main account, plus expected revenue receipts plus the permitted amount of banking system credit. In terms of its stated objectives there is little doubt that the strict supervision of expenditure was successful - in 1978 current expenditure was, for the only time since 1964, marginally less than the estimate. However, the effects on development may have been more profound, though it is impossible to quantify them. Certain payments - debt service, salaries, contractual obligations - were given priority, in view of legal and other commitments; consequently, less binding expenditure commitments, including some items of capital expenditure, tended to be deferred pending the availability of finance. In summary there is clear evidence of repetitive budgeting - the initial preparation of estimates under a clearly (indeed constitutionally) defined procedure with formal parliamentary approval, followed by a rather less clear procedure for containing actual expenditure, in which the finance ministry and the Bank of Zambia played the central role.

8.6 Financing the deficit

Earlier sections of this chapter outlined the growth of loan financing in response to a burgeoning deficit. The means of financing

this were primarily threefold: long-term internal, long-term external and short-term, the last of these in practice coming mainly from the domestic banking system. Their relative importance in the years since 1970 is shown in Tables 8.18 and 8.19; comparable and reliable data are not available for previous years, but the volume of borrowing before 1970 was very small relative to later years (see Appendix S, Table S 7.7).

From Table 8.18 it is found that total government borrowing was large and positive in all but 1970 and 1974. The impression formed from this table is that, although the total borrowing requirement did not show substantial variation (with the exception of 1970 and 1974) the borrowing from individual sources was not at stable. A more systematic analysis may be made on the basis of Table 8.9, from which it may be seen that the banking system taken as a whole provided over three quarters of the finance for all but two of those years in which positive (net) government borrowing occurred. The two years in which this was not the case were 1973, when heavy external borrowing was undertaken to finance the redemption of the ZIMCO bonds, and 1979 when a concerted effort was made to raise the disbursement rate on external borrowing. The main source of government borrowing was short-term domestic financing, and between 1971 and 1979 (excluding 1974) about two thirds of all new government debt was of this type - almost entirely consisting of three month Treasury bills. This short-term financing was provided almost exclusively by the banking system; indeed in several years the banking system took up over 100 per cent of the net increase as the various non-bank financial institutions

Table 8.18 Sources of finance for central government borrowing, 1970-79

(Million kwacha)

	Total central government borrowing	External	Internal			Total
			Monetary authorities	Commercial banks	Other	
1970	-42.8	8.6	-53.0	-4.5	6.1	-51.4
1971	131.2	34.7	112.1	-11.8	-3.8	96.5
1972	102.2	21.7	32.7	44.3	2.5	79.5
1973	266.2	138.1	49.9	37.8	41.4	129.1
1974	-91.1	36.5	-43.9	-81.5	-2.2	-127.6
1975	344.9	58.7	172.9	95.7	17.6	286.2
1976	259.8	30.0	50.4	146.2	33.2	229.8
1977	279.7	18.8	-20.6	251.5	30.0	260.9
1978	344.1	20.2	683.6	-389.6	29.8	323.8
1979	222.9	137.5	-80.0	140.1	25.2	85.3

Source: Compiled from Appendix S, Table S.7.7.

Table 8.19 Proportionate structure of government borrowing, 1970-79

	Percentage structure of total borrowing				Percentage of short-term borrowing financed by		
	Debt instrument		Source		Monetary authorities	Commercial banks	Banking system
	Long-term loans (a) External (net)	Short-term loans (b)(c) Internal (net)	Monetary authorities	Commercial banks				Total banking system
1970 (d)	...	...	...	...	...	...	...
1971	26	12	85	-9	115	-12	103
1972	21	32	32	43	19	88	107
1973	52	12	2	31	3	72	74
1974 (d)	...	...	...	...	...	...	...
1975	17	6	22	56	27	74	101
1976	12	13	26	50	40	62	102
1977	7	5	-1	83	14	86	100
1978	6	4	217	-132	243	-143	100
1979	62	7	-36	63	-113	210	97

Source: Appendix S, Table S.7.7.

(a) Debt with original maturity greater than twelve months.

(b) Debt with original maturity of less than twelve months and including overdrawn bank accounts.

(c) Assumed to be held by domestic institutions.

(d) Percentages not calculated for years where total borrowing was negative - i.e., where there was a surplus.

(e.g., the Zambia State Insurance Corporation and the Zambia National Provident Fund) ran down their holdings of such short-term assets. It was noted in Section 8.1 that borrowing from the banking system had the potential for stimulating inflation and that central bank lending in particular had the highest such potential. In the next Section (8.7) it will be seen to what extent domestic credit expansion was affected by the government's borrowing needs.

Within the banking sector itself there was very substantial variation in the annual amounts lent by the Bank of Zambia (the central bank) and the commercial banks, and in the balance between the two. In the years from 1975 the source of short-term lending from within the banking sector was heavily influenced by the authorities treatment of the monetary consequences of the arrears on external payments. The domestic current equivalent of payments due in respect of imports and other overseas payments, were, until 1978, held by the commercial banks pending the availability of foreign currency. The authorities directed that these funds should be held in the form of Treasury bills. As the payments arrears rose rapidly from 1975 to 1978 so the commercial banks' holdings of liquid assets grew: the actual liquidity ratio (54) from 35.2 per cent at the end of 1974 to 125.0 per cent in April 1978, very clearly creating the possibility for massive credit expansion subject to the demand for new credit and any other restrictions which might be imposed by the authorities. This approach by the authorities represented a cheap and easy way to finance the government deficit and the Treasury Bill rate remained unchanged at between 4.2 and 4.5 throughout this period. In April 1978 the authorities decided,

in the context of the 1979-80 IMF programme, to alter the regulations so that all domestic currency funds held in respect of the payments arrears were thereafter placed at the Bank of Zambia as a 100 per cent reserve requirement; a nominal 2 per cent rate of interest was to be paid on all such deposits. Thus all Treasury bills issued against payments arrears were redeemed and the Bank of Zambia then re-lent the proceeds of the reserve fund to the government against a special (non-marketable) Treasury bill issue. This procedure largely explains the remarkable "swings" between the monetary authorities and the commercial banks as the source of government financing from 1977 to 1979. The other reason for the very heavy borrowing from the central bank in 1978 was that (as discussed in Section 6.2) lending by the Bank of Zambia (and a limited amount by some commercial banks) to the mining companies was transferred to the government's accounts, and in order to finance this a special loan was extended by the Bank of Zambia to the government. With respect to this latter transaction, it is argued that there was no inflationary impact at all in 1978; the additional purchasing power had been created by the initial extension of credit to the mining sector in 1976 and 1977. The central bank credit to government (amounting to K 178 million) for this transaction was therefore simply an accounting adjustment. A similar argument may be applied to the consolidation of the arrears (an amount equal to about K 470 million). Thus of the K 683.6 million "lent" by the central bank to the government in 1978 (see Table 8.18) nearly K 650 million represented the consolidation of previous transactions for which the government then assumed direct responsibility.

The summary data of Table 8.20 show that until 1974 the structure and growth of government indebtedness was well balanced in the sense that about 90 per cent of debt outstanding was of longer term maturity (see Section C of Table 8.20), and in the years between 1964/65 and 1974 the trend growth rates of short-term debt showed little variation from the growth of longer maturing debt. It was the succession of large deficits from 1975 onwards which caused this balance to be disrupted: there was a thirty-fold growth of short-term government indebtedness between 1974 and 1979, and in this period the rate of expansion of long-term debt declined. The combined effect of these two features is reflected in Section 8 to Table 8.20 which reveals that the volume of long term indebtedness expressed in constant prices showed a slow secular decline.

The slowest overall growth (and fastest decline after 1975) is observed with respect to long-term "internal" indebtedness, that is the balance owed to domestic creditors (both banks and other institutions). This seems to have arisen from the government's reluctance or inability to issue medium or long dated stocks. Reference to Appendix S, Table S.7.1. reveals that the government's "internal" long-term borrowing by type of debt instrument have changed substantially since 1969; in that year almost all such borrowing was financed by stocks, which represented capital assets which were, in principle at least, tradable and could be held by any person whether or not it was a financial institution. In 1973 a gradual change commenced, in which the government began to rely increasingly on direct loans from a limited number of non-banking financial institutions (mainly the

Table 8.20 Principal aggregates of central government debt:
Growth rates and structure

(Percentages)

	1964/65 to 1970	1970 to 1974	1974 to 1979	
<u>A. Trend growth rates: current prices</u>				
Total debt outstanding	10.9	21.6	27.2	
Long term	10.8	15.8	12.3	
External	(13.1)	(25.6)	(15.8)	
Internal	(9.2)	(13.0)	(7.1)	
Short term	12.2	18.0	85.5	
<u>B. Trend growth rates: constant prices (a)</u>				
Total debt outstanding	4.8	13.0	13.6	
Long term	4.6	12.3	-3.2	
External	(6.8)	(5.1)	(-0.1)	
Internal	(3.2)	(3.5)	(-7.7)	
Short term	6.0	9.7	59.9	
	<u>1964/65</u>	<u>1970</u>	<u>1974</u>	<u>1979</u>
<u>C. Proportionate structure (b)</u>				
Total debt outstanding	100.0	100.0	100.0	100.0
Long term	89.7	89.5	94.9	50.9
External	(36.0)	(38.2)	(52.8)	(33.5)
Internal	(53.6)	(51.3)	(42.1)	(17.4)
Short term	10.3	10.5	5.1	49.1
<u>D. As a percentage of total revenue and grants</u>				
Total debt outstanding	135.0	76.2	103.0	368.0
Long term	121.0	68.2	97.8	187.3
External	(48.5)	(29.1)	(54.4)	(123.5)
Internal	(72.4)	(39.1)	(43.3)	(63.9)
Short term	14.0	8.0	5.3	180.7

Source: Calculated from Appendix S, Tables S.7.8 and S.7.9

(a) Deflated by implicit price index of total domestic final expenditure.

(b) Based on current price valuation.

Zambia State Insurance Corporation, the Zambia National Provident Fund, and the government's own Civil Service pension fund), and by 1978 and 1979 had altogether ceased to offer medium- or long-term stocks. Thus by its own financing policy the government forced the banking system to hold Treasury bills, if it wished to include any government securities in its portfolio. Although it was necessary for the banking system to retain relatively liquid assets during the post-1975 period in order to cover its commitments in respect of the arrears on external payments, there would almost certainly have been the possibility of requesting (or even compelling) the commercial banks to purchase substantial amounts of longer dated securities (55). Perhaps the main reason that the government did not take this course was that interest rates on Treasury bills (at about 4.5 per cent) were significantly below those offered on longer term securities: the rates offered on the institutional loans extended to the government after 1975 were in the range 7.5 to 9.0 per cent (56). Thus the government administered interest rate structure was inimical to the control of the liquidity base on which, in turn, the control of the money supply depended (57).

The other notable feature revealed by Table 8.20 is the reduction in the rate of growth of net external borrowing by the government, an apparently perverse reaction in that the dual gap model would suggest that the fall in domestic saving should be supplemented by an increase in "imported savings", and that an important channel for this would be the government budget. The dynamics of total (and disaggregated) external borrowing are examined in Chapter 9, and it will

suffice here to note but two reasons for the limited resort to external borrowing. The first was that the capital budget was severely constrained as noted in Section 8.4.3. Most external loans do not cover 100 per cent of even the capital costs of the projects for which they are intended: thus the government is obliged to fund a certain proportion of total costs from local sources. This became increasingly difficult as the government budget became more constrained. The second factor again concerns the interest rate structure: since average domestic interest rates (58) were significantly lower than the rates charged on many external loans (59), there was little incentive for the government to seek new loans from abroad. Certainly it could be argued that the relevant marginal interest rate on foreign borrowing was the rate on Euro-currency borrowing (of the order of 12.0 per cent in 1979 (60)), which contrasted very unfavourably with the top rate of 9.0 per cent offered on domestic loans from the financial institutions and the 4.5 per cent offered on Treasury bills.

The discussion of the section has shown that the financing of the government deficits of the late 1970s had significant linkages with external indebtedness (to be discussed in Chapter 9) and with domestic monetary control to which attention is now devoted.

8.7 Survey of monetary developments

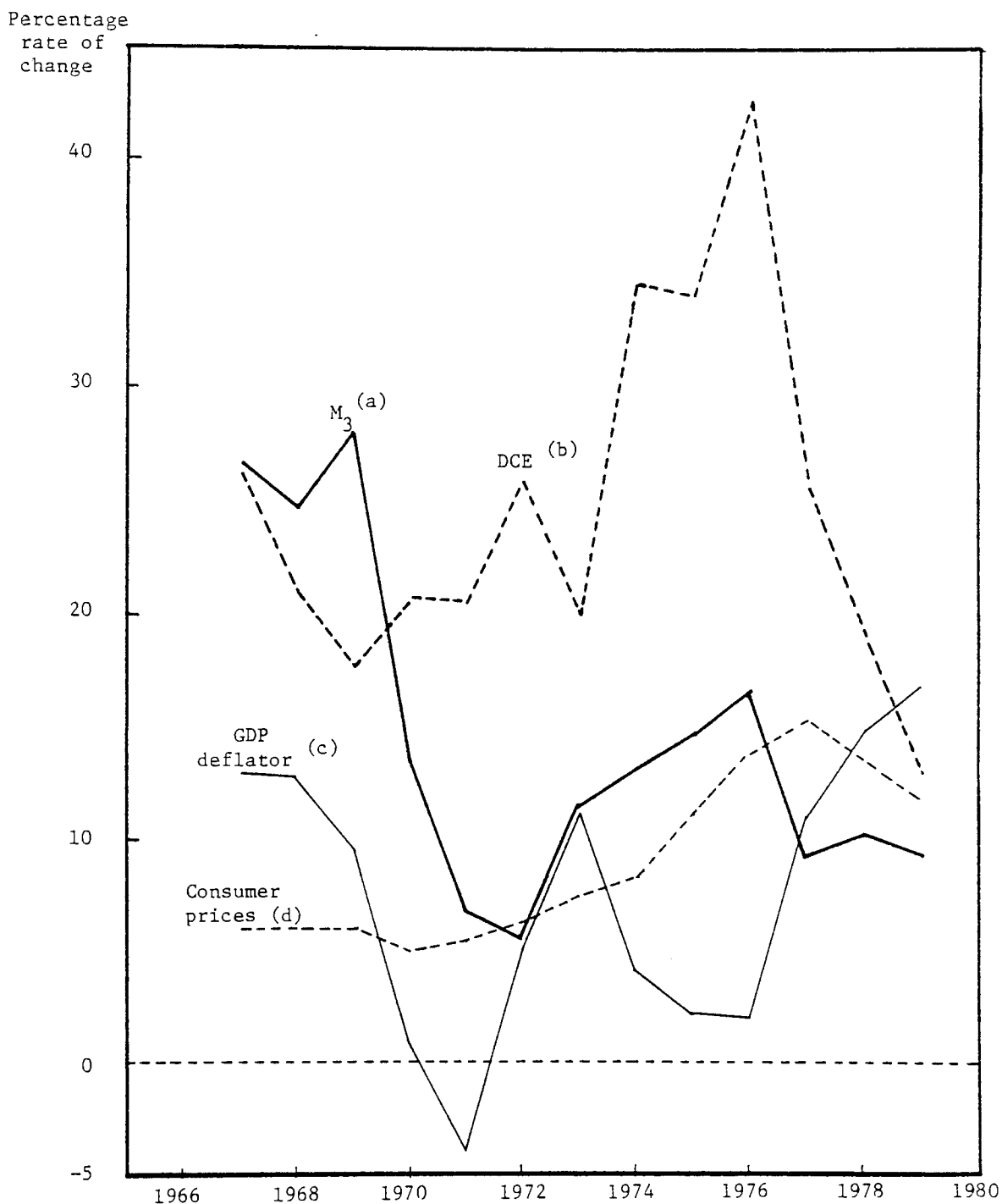
In Section 2.5.5 some preliminary evidence was produced which suggested that there was very little connection between the annual rates of change of the money supply and the price level as measured

by two indices of consumer prices. It was noted there and in Section 8.1 that monetary expansion does not necessarily lead to price inflation, and the quantity identity ($MV = PT$) itself shows that monetary expansion may be absorbed by a higher output or by a declining velocity of circulation. In the following paragraphs some of these relationships are explored further.

8.7.1 Monetary growth and inflation

Figure 8.3 illustrates the very limited extent to which monetary aggregates and the price level are correlated. Two alternative methods measuring the price level were used: the consumer price index for high income households, which represents a wide cross-section of consumption goods (including both essential and luxury goods); and the implicit deflator of total gross domestic product chosen because it reflects price movements of both domestic and internationally traded goods - in particular it allows the effects of variations in the price of (copper) exports to be taken into account. This latter point is important because of the close relationship between the balance of payments and the domestic money supply, an issue which will be examined later in this section. The two monetary aggregates used are the "broad" money supply, M_3 (money plus quasi-money), and domestic credit expansion (DCE) (61). Despite the attempt to identify clearer trends by the use of three year moving averages all the series (except the high income consumer price index) continued to show substantial fluctuation over the entire period. No clear relationships could be established for the period as a whole; but a fairly strong positive relation can be observed between changes in M_3

Figure 8.3 Three year moving averages of annual rates of change of monetary aggregates and price levels, 1966-80



Sources: (a) and (b) calculated from Appendix S, Table S.8.1.
(c) calculated from Appendix S, Table S.1.2 and S.2
(d) Table 2.11.

Notes: (a) Broad definition of money.
(b) Domestic credit expansion.
(c) Implicit deflator of gross domestic product.
(d) Index of consumer prices for high income households.

and the annual rate of change of the implicit GDP deflator in the years between 1967 and 1973, while changes in M₃ and the consumer price index appear to be weakly related in the years after 1973.

Table 8.21 presents the results of the regression of changes in the price level on changes in the two monetary aggregates based upon a log-linear relationship and using the same moving average data as Figure 8.3. The results confirm the impression created by Figure 8.3 that the relationship between monetary expansion and inflation after independence was very weak. Indeed the only statistically significant result in Table 8.20 is the regression of high income consumer prices on domestic credit expansion lagged by one year, but even in this case the coefficient of determination (R^2) was only 0.4450. Thus the conclusion must be drawn that the explanation of inflation in Zambia does not lie primarily in the expansion of the money supply, and that other influences must be sought (62).

8.7.2 The velocity of circulation of money

It has already been noted that inflationary pressure created by the expansion of domestic credit can be absorbed by a declining velocity of circulation (the evidence of Chapters 2 and 3 concerning Zambia's slow growth rates, suggests that the "absorptive" effect of expanding output was negligible). Table 8.22 provides strong evidence that there was a pronounced secular decline in the income velocity of circulation of money with respect to both broad and narrow definitions of money, and also when "income" is measured in two ways. The accepted approach to the measurement of the income velocity of

Table 8.21 Regressions of changes in price level on changes in monetary aggregates (a)

Dependent Variable(a)	Independent Variable (b) (c)	Intercept	Slope	R ²	t _b (d)	F(e)
PHI	DCE	3.40	0.282	0.0521	0.7774	0.6044
PHI	M ₃	11.89	-0.143	0.0343	-0.6247	0.3902
GDP DEFL	DCE	248.2	-1.248	0.0810	-0.9844	0.9691
GDP DEFL	M ₃	0.471	0.913	0.1105	1.169	1.3669
PHI	DCE ₋₁	0.398	0.955	0.4450	2.831	8.0176
PHI	M ₃ (-1)	14.25	-0.201	0.0693	-0.8626	0.7441
GDP DEFL	DCE ₋₁	0.661	0.596	0.0135	0.3698	0.1368
GDP DEFL	M ₃ (-1)	11.204	-0.357	0.0169	-0.4148	0.1721

Sources: As for Figure 8.2.

(a) All data based on three-year moving averages. Regression based on log-linear relations.

(b) PHI - rate of change of high income consumer price index; GDP DEFL - rates of change of implicit deflator of gross domestic product.

(c) DCE - rates of change in domestic credit (gross); rates of change of "broad" money supply; subscript "-1" shows lagged relationship.

(d) Critical value at 5 per cent level of significance: unlagged -1.796; lagged -1.812.

(e) Critical value at 5 per cent level of significance: unlagged -4.84; lagged -4.96.

Table 8.22 Trends in the velocity of circulation
of money, 1965-80 (a)

	Velocity of circulation with respect to			
	Total gross domestic product		Total domestic final expenditure	
	M ₁ (b)	M ₃ (b)	M ₁ (b)	M ₃ (b)
A. <u>3-year moving averages centred on:</u>				
1966	8.41	6.04	7.38	5.30
1967	7.47	5.42	6.78	4.92
1968	7.21	5.04	6.09	4.29
1969	6.97	4.42	5.63	3.59
1970	6.72	4.01	5.58	3.32
1971	6.52	3.76	6.14	3.56
1972	6.41	3.84	6.07	3.64
1973	6.79	4.02	6.19	3.67
1974	6.20	3.78	5.95	3.65
1975	5.73	3.54	5.74	3.56
1976	5.10	3.07	5.34	3.23
1977	5.39	3.18	5.30	3.13
1978	5.34	3.06	5.21	3.09
1979	5.54	3.19	5.50	3.27
B. <u>Least squares exponential time trend 1965-1980</u>				
a	8.23	5.76	6.90	4.79
b	-0.033	-0.049	-0.020	-0.034
R ²	0.7115	0.7991	0.3900	0.5258
t _b	-5.876	-7.462	-2.992	-3.940
F	34.53	55.68	8.95	15.52

Source: Calculated from Appendix S, Table S.8.1.

(a) Measured as the income variable divided by the monetary variable.

(b) For definition, see Appendix S, Table S.8.1.

circulation of money is to divide total gross domestic product by the money supply, but in the case of Zambia both income and monetary aggregates can be distorted by the fluctuations in the realized price of exports; that is an exogenous event like a rise in the price of copper could cause the value of net exports to rise, and simultaneously the domestic money supply would be increased by the rise in net foreign assets. The effects of this on velocity are not predictable, but substantial variation can occur: in 1974 when copper prices were high, the (GDP based) velocity of circulation of M_1 was 7.12, and in 1975 when copper prices declined sharply and GDP fell in current prices velocity fell to 4.92, the money supply in the latter year being expanded by the extensive resort to central bank credit by the government. Thus the use of total domestic final expenditure as an alternative to GDP is intended to remove the effects of one source of distortion in the income variable. It must be stressed that no similar attempt was made to remove the effects of net foreign assets from the money variables and it is suggested that this may account for the apparently slightly weaker results (in terms of statistical significance) achieved with respect to the time trend of velocity measured relative to total domestic final expenditure.

Table 8.22 summarizes the trend of velocity using three year moving averages, and each of the four series reveals a fairly rapid decline during the 1960s, with a less clear pattern emerging during the 1970s, with some variation from year to year in the trend. Part B of the Table provides evidence that the secular decline continued: the least squares exponential trend lines resulted in "b" coefficients

Table 8.23 Trend growth rates of principal monetary aggregates,
1965-80

(Percentages)

	Money (narrow) M ₁ (a)	Quasi-money (b)	Total money supply M ₃ (c)
1965-70	19.9	38.7	26.5
1970-75	11.5	4.0	8.3
1975-80	9.7	14.6	11.6
1965-80	12.3	16.9	13.9

Source: Calculated from Appendix S, Table S.8.1.

- (a) Demand deposits plus currency held by the non-bank public.
- (b) Private sector deposits with monetary authorities plus savings deposits plus time deposits.
- (c) Money plus quasi-money.

which were significantly less than zero at the 0.5 per cent level in all cases. It will be recalled that in Section 8.1 Furness' (1975) observations with respect to the velocity of circulation in a developing country were summarized. His distinction between active and idle money may be taken to be roughly equivalent to "money" and "quasi-money" respectively in the definitions used here. It is apparent from Table 8.23 that "quasi-money" or idle money grew very much more rapidly than "money" (i.e., M_1) in the years between 1965 and 1970. This growth of quasi-money (time and savings deposits) would correspond with Furness' statement that velocity can be expected to decline at a time when idle balances are growing relative to active balances, a phenomenon which he suggests occurs with rising per capita wealth and the increasing monetization of the economy. It is suggested that both effects were indeed present in Zambia in the period 1965-70 but it is also true that mining company deposits were large as a result of high copper prices. The less consistent decline in velocity during the 1970s accords with the relative growth behaviour of money and quasi-money in the two periods during the 1970s distinguished in Table 8.23 between 1970 and 1975 quasi-money grew more slowly, but more rapidly after 1975. Furness suggests that a relative decline in the demand for idle balances (or quasi-money) would be associated with the spread of financial intermediation and the growth of credit facilities - it is certainly the case that banking operations were being extended throughout the period in question, and that many schemes were introduced to promote the use of credit, especially in the agricultural sector.

The conflicting influences which may affect income velocity mean that no clear trend may be discerned for developing countries in general, a conclusion supported by the evidence provided by Furness (1975, pp 154-55) and in unpublished work by Lahiri and by Driscoll and Lahiri (undated - see references). The latter suggest that if sectoral shares remain unchanged there was no apparent tendency for velocity to decline with increasing income. However their conclusion was sensitive to the precise specification of their underlying econometric model. They also suggest that in several agricultural developing countries inflation can exert an upward influence on velocity. Nevertheless their results do not lead to firm conclusions about the direction of change of velocity in developing countries. Thus in conclusion it should be noted that it is not safe in either short or long term economic planning to assume that velocity is constant, nor can the direction of change be predicted on a priori grounds. Any analysis of inflation which includes monetary factors must take account of income velocity, and it must do so in the context of the institutional and structural characteristics specific to the individual economy. Thus in the case of Zambia while rapid monetary growth did indeed occur its inflationary impact was greatly reduced by the persistent secular decline in the velocity of circulation of money; but it is also noted that the decline slowed considerably in the later years of the 1970s, and it is unlikely that substantial further decline can be expected in the future - there is a point when the nature of financial intermediation in a country imposes "physical" restraints on the capacity for further reductions in the velocity.

8.7.3 Sources of monetary growth. It was established in the previous sub-section that monetary growth was rapid in the period under analysis, and it can also be inferred from Section 8.6 that a major source of this monetary growth came from the substantial resort by the government to deficit financing from the banking system. Table 8.24 allows a more systematic examination to be made of the principal sources of growth of the money supply (broadly defined), based on the identity given in Section 8.1 between the assets and liabilities of the banking sector. Once again the division of the period since 1965 into three sub-periods reveals very substantial variation in the behaviour of the various aggregates. Between 1965 and 1970 the money supply grew under the benign influence of rising net foreign assets and a decline in the net claims of the banking system on the government. Claims on the private sector represented only a modest proportion (less than 40 per cent) of the total increase in the money stock. In the subsequent two sub-periods net foreign assets fell substantially and helped to reduce the expansionary influence of the government's borrowing from the banking system. Claims on the private sector rose quite rapidly during the years 1970 to 1975 but the expansion from this source declined markedly after 1975; this is indicative of the way in which the demand for credit may represent a restraining influence on the expansionary potential created by deficit financing from the banking system. That is, until 1974 the economy was relatively buoyant, but thereafter recession set in with the result that demand for new credit from industrial and commercial institutions became more restrained. It should be stressed that after 1978, with

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Table 8.24 Components of annual changes in money supply (a) (b)

(Million kwacha)

	Money (c) (M ₃)	Net foreign assets	Claims on government (net)	Claims on private sector	Other items(d)
<u>1. Annual change</u>					
1966	37.8	9.4	2.6	24.6	-1.2
1967	24.1	-23.4	17.7	29.1	-0.8
1968	49.3	5.6	31.1	-5.3	-17.7
1969	62.8	127.6	-81.2	21.6	5.1
1970	74.1	113.8	-45.3	24.6	19.1
1971	-37.1	-195.4	182.4	45.8	69.9
1972	22.5	-107.6	128.6	-17.7	-19.5
1973	74.5	-11.4	57.8	9.8	-18.0
1974	25.2	9.4	-126.9	161.0	17.9
1975	52.2	-151.6	239.7	57.1	93.3
1976	130.5	-39.7	253.3	6.6	89.7
1977	75.3	-68.8	220.0	70.8	146.7
1978	-59.3	-128.1	270.7	-48.1	154.4
1979	192.8	28.5	59.8	60.8	-44.2
1980	74.9	-104.8	232.9	22.3	75.3
<u>2. Change over whole period</u>					
1965-70	248.1	233.0	-75.1	94.6	4.5
1970-75	137.3	-456.6	481.6	256.0	143.6
1975-80	414.2	-312.9	1,036.7	112.4	421.9
Total	799.6	-536.5	1,443.2	463.0	570.0

Source: Calculated from Appendix S, Table S.8.1.

(a) Change in money supply is equal to the sum of changes in net foreign assets and claims on the government and private sectors less the change in other items.

(b) Figures of broad money supply may not be exactly equal to the sum of the other four items due to cumulative rounding errors.

(c) M₃ is broad money, i.e., narrow money plus quasi-money.

(d) From 1975 is understood to include banking sector liabilities in respect of external payments arrears - separate data are not published to allow analysis of the item.

the commencement of the IMF programme, credit to all private sector borrowers (with the exception of the mining companies) was severely controlled - in other words the 1978-80 IMF programme gave the priority in domestic credit expansion to the needs of the government sector.

One further influence is "other items (net)" which are seen to have risen steeply from 1975. Although disaggregated data are not published for the further analysis of this item, it is believed to include banking system liabilities in respect of the external payments arrears - that is liabilities created by the fact that the original importer had paid to the bank the kwacha (domestic currency) equivalent of the foreign currency due to the supplier, but payment by the banks had then been blocked by the non-availability of the necessary foreign currency. It could, therefore, be argued that this item should be more correctly classified under 'net foreign assets' - the effects on the domestic money supply are exactly the same, so that from 1975 the accumulation of external payments arrears was another way in which the effect of heavy government deficit financing on the money supply was diminished.

The inflationary potential represented by heavy borrowing from the banking system is illustrated by Table 8.25 which gives an analysis of the liquidity of the commercial banking system. Until 1975 when significant short-term deficit financing commenced, Treasury Bills had represented a fairly small proportion of the commercial banks liquid assets, but in the three years 1975 to 1977 about 85 per cent of the increase in the banks' liquid assets was accounted for by

Table 8.25 Analysis of liquidity of the commercial banks

	Million kwacha		Percentages		
	Total liquid assets	of which: Treasury Bills	Liquidity ratios (a)		
			Total (b)	Actual (c)	Formal (d)
1965	59.5	11.3	62.4	29.2	33.2
1966	81.5	12.2	64.1	24.1	40.0
1967	58.0	5.2	39.0	16.2	22.8
1968	89.3	30.0	46.1	23.2	22.9
1969	110.6	37.1	46.3	25.0	21.3
1970	117.3	21.1	43.9	17.0	26.9
1971	107.4	11.4	37.4	11.7	25.7
1972	145.3	52.6	47.1	20.8	23.3
1973	199.5	78.5	53.4	24.8	28.6
1974	144.3	2.4	34.9	4.2	30.7
1975	229.0	99.5	52.6	26.4	26.2
1976	415.1	236.7	77.7	48.4	29.4
1977	687.8	467.0	107.4	88.5	18.9
1978	307.7	85.7	53.5	19.8	33.7
1979	479.5	231.6	61.4	33.9	27.5
1980	479.7	242.9	58.1	34.4	26.7

Source: Bank of Zambia, Quarterly Statistical Review, September 1975 and March 1981, Lusaka: Bank of Zambia (Tables 1(v) and 1(vi) in each issue).

(a) Expressed as percentages of total liabilities to the non-bank domestic public.

(b) Equals "Actual" plus "Formal" liquidity.

(c) Notes and coins, Treasury Bills, external liquid assets (up to 1972).

(d) Minimum reserve requirements, bills of exchange and promissory notes, local registered stocks, money at call, items in transit.

Treasury bills. The reason for this was discussed earlier: the kwacha equivalent of the external payments arrears had to be held in Treasury bills. While this represented an easy way of financing the growing government deficit it also meant that unless otherwise restrained the commercial banks' liquidity ratios were very rapidly inflated: it would have been possible for the banks to extend new credit to the private sector in order to restore their liquidity ratios to the minimum of 30 per cent prescribed by the monetary authorities from 1976 (63). That this did not happen is due to the lack of demand for credit from customers deemed to be creditworthy by the commercial banks, and also from 1978 by the credit ceilings imposed by the authorities in the context of the IMF programme. While these ceilings were never published, they are known by the author to have been very tight indeed particularly during 1978 when virtually no new credit was permitted to the non-government and non-financing sectors in spite of the extremely tight cash flow position of many companies (particularly in the parastatal sector). The use of liquidity ratios as an instrument of monetary control had little value: with the exception of a brief period during 1974 liquidity ratios were consistently far in excess of the prescribed minimum. This fact points to the need in any analysis of monetary expansion to refer to the demand for money as well as the supply factors. Table 8.25 shows that the government's resort to short-term borrowing from the banking system certainly created the potential for massive monetary expansion which in fact was only partly realized.

8.7.4 Interest rates. The use of interest rates as a policy instrument was almost completely absent from the authorities' portfolio. Table 8.26 shows the remarkable stability of interest rates in the entire post-independence period. This is a result neither of a stable capital market nor of a low rate of inflation, but rather is an indication of the absence of any attempt control monetary aggregates by the use of interest rates. Even in the 1960s most Zambian interest rates (with the exception of bank overdrafts) were negative in real terms (i.e., they were less than the rate of inflation), but this effect became much more pronounced as the rate of inflation rose in the middle and late 1970s, and by 1977 the rate of inflation was at least double the level of even the highest interest rates. In view of this negative cost of borrowing it is indeed remarkable that the demand for credit was so constrained in this period, when, as was seen in the previous sub-section, the commercial banks' liquidity was extremely high. For this reason it is suggested that the use of interest rates as a means of controlling inflation through the reduction of the demand for money would have proved ineffective since demand was already so depressed. Nevertheless there are at least two other structural characteristics in the Zambian economy which suggest that an increase in interest rates would be beneficial. One is that the Zambian economy is geared toward the use of capital intensive techniques - an increase in the cost of capital might induce a greater use of labour, thus improving the economy's employment creation potential. The other is that rates on savings were extremely low even by comparison with institutional loan rates: higher savings interest

Table 8.26 Zambian and international interest rates: 1965-80

(Per cent per annum)

	Zambia				International			Zambian inflation: rate of change of high income consumer price index (b)		
	Central bank rate (a)	Average Treasury bill rate (b)	Commercial banks		U.S. Central Bank discount rate (a)	U.K. Central Bank discount rate (a)	Eurodollar rates London (a)			
			Savings accounts (a)	Overdrafts (a) (c)					Building Societies Savings share (a)	Residential mortgage loans (a)(c)
1966	4.5	3.80	3.00	6.5	3.0	7.3	4.5	7.0	6.12	5.1
1967	5.0	4.36	3.48	7.0	3.4	7.5	4.5	8.0	5.46	5.1
1968	5.0	4.46	3.50	7.0	3.5	7.5	5.5	7.0	6.36	8.6
1969	5.0	3.30	3.50	7.0	3.5	7.5	6.0	8.0	9.76	4.4
1970	5.0	3.11	3.50	7.0	3.5	7.5	5.5	7.0	8.52	5.0
1971	5.0	3.40	3.50	7.0	3.5	7.5	4.5	5.0	6.58	5.8
1972	5.0	4.01	4.0	7.5	3.5	7.5	4.5	9.0	5.46	5.6
1973	5.0	3.80	4.0	7.5	3.5	7.5	7.5	13.0	9.24	9.0
1974	5.0	4.00	4.0	7.5	3.5	7.5	7.5	11.5	11.01	7.5
1975	5.0	4.20	4.0	7.5	3.5	7.5	6.0	11.25	6.99	8.5
1976	6.0	4.37	6.0	8.25	4.0	7.5	5.25	14.25	5.58	16.1
1977	6.0	4.38	6.0	8.25	4.0	7.5	6.0	7.0	6.00	17.1
1978	6.5	4.50	7.0	9.50	4.0	8.0	9.5	12.5	8.73	12.2
1979	6.5	4.50	7.0	9.50	4.0	8.0	12.0	17.0	11.96	10.7
1980	6.5	4.50	7.0	9.50	4.0	8.0	13.0	14.0	14.36	...

Sources: Zambian interest rates: Bank of Zambia, Report and Statement of Accounts 1975 and 1980, Lusaka; Bank of Zambia (Table 8 in each issue).

International interest rates: International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington; International Monetary Fund (page 56).
Zambian inflation: Table 2.8.

- (a) End of period.
- (b) Period average.
- (c) Minimum.

rates would certainly offer a greater incentive to domestic savings, although so little is known about the behaviour of household savings in Zambia that there can be no guarantee that higher interest rates alone would bring forth a significantly higher volume of savings.

Two further arguments may be adduced for a more flexible interest rate policy. Firstly, it was noted in Chapter 6 when discussing the mining companies' financial crisis in 1977 and 1978 that the low level of domestic interest rates meant that there was no incentive for these companies to seek foreign borrowing even though their creditworthiness was still acceptable to the international capital markets. Thus there is a case for bringing domestic commercial interest rates more closely into line with international rates, although if applied without discrimination such a policy could penalize and hinder the advancement of smaller and more vulnerable commercial enterprises. Two ways of circumventing this can be suggested: concessional rates for selected priority industries or companies as one possibility, the other being a system of premiums charged on selected industries which are believed to be capable of borrowing on international markets. The second area in which action is needed relates to the rates at which the government itself can borrow in domestic markets. It was suggested in Section 7.6 that one of the reasons that such a large proportion of central government borrowing took the form of Treasury bills taken by the commercial banking system was that the interest rate structure was biased towards the cheaper Treasury bill rate, and that the banks represented a "captive" market, compelled to take up Treasury bills to cover the external payments arrears. There is a good case for

narrowing, if now completely eliminating, the differential between the Treasury bill rate and the rate at which the government can borrow from the financial institutions. While this would inevitably increase the government's debt service costs, it would allow the "price" of borrowing to act as a market signal, discouraging excessive reliance on short-term financing (64).

8.8 Conclusion

The Zambian government was faced in the second half of the 1970s with the need for an intolerably fast series of adjustments in its own financial structure. The disappearance of a source of revenue which had previously accounted for over half of its total revenue receipts within the space of three years, was aggravated by one seriously misjudged budget - that of 1975 when expectations of the future were still influenced by the short lived commodity price boom of 1973 and 1974. From 1975 substantial reductions were imposed in the level of real expenditure particularly in capital and development oriented current spending, but these were not sufficient to match the decline in the real value of government revenue. Consequently, the government was forced to resort to extensive borrowing. The net inflow of foreign financial assistance to the government budget was not sufficient to meet this need, nor was the availability of long-term domestic capital. Thus the major part of the central government borrowing requirement was covered by short-term borrowing from the banking system: the absence of any capital market in Zambia means that there is very limited demand for short-term government securities from non-bank sources, and indeed the demand from the commercial

banks was limited by various factors explored in this chapter. As a result the central bank (the Bank of Zambia) provided a very large proportion of the government's financing in several years, potentially the most inflationary form of short-term borrowing. Nevertheless the inflationary impact of this form of government financing was muted by the domestic recession which restricted demand for new credit, by the drain on the money supply represented by declining net foreign assets, and significantly by the secular decline in the income velocity of circulation.

In summary it is probably true to say that fiscal or budgetary policy was a moderately active tool in the government's portfolio only during the 1960s insofar as the stimulation of economic growth and development is concerned. In the years after 1975 the government's policy was dominated by the need to adjust to a much weaker resource base imposed by external factors. Monetary policy throughout the post-independence era was passive, dictated by the needs of financing the government budget, or by reacting to the more benign influence in earlier years of rising net foreign assets, when any monetary expansion could be expected to be absorbed by a higher level of economic activity. The conclusion is that excessive pre-occupation with controlling the government deficit in order to restrain the rate of inflation would be misguided - it was seen that the linkage between monetary growth and inflation was very weak, and also that the expansionary influence of deficit financing was moderated by other structural characteristics specific to Zambia. In short, instability triggered by

external factors cannot be solved by stabilization policies whose purpose is solely to cure domestic imbalances.

Notes

1. For instance see Cline and Weintraub (1981, page 1).
2. For instance see Crockett (1981); and Argy and Salop (1971).
3. The basis of the dual-gap model was that this equality did not hold in the ex ante sense.
4. Government savings are defined here as the difference between current expenditure and current revenue (including grants).
5. There might of course be a J-curve effect where the balance of payments initially deteriorates due to import supply lags: that is, orders for imports placed prior to a devaluation must be honoured, with payments being made at the higher (in domestic currency terms) price resulting from a devaluation.
6. "Net lending" consists of lending to non-governmental institutions (parastatal or nationalized industries) and in some cases includes equity investment. It may therefore be regarded as development oriented expenditure.
7. This idea was introduced Chapter 1, it was elaborated by Johnson (1967) and has since been widely discussed in textbook treatments (e.g., Thirlwall (1974), and Killick (1981 a)).
8. It is necessary to do no more than state the quantity identity
$$MV = PT$$
(where M is the money supply, V is the velocity of circulation, P is the price level and T is the volume of transactions) in order to realize that velocity is crucial in explaining the level of inflation.
9. "Monetization" may be regarded as the process of bringing the traditional, subsistence or non-cash sectors into the money or formal economy.
10. That is, all banking institutions other than the central bank.
11. "Money" covers sight deposits and currency; "Quasi-money" includes savings and time deposits. The commonly used notation M_1 corresponds to "money", while M_3 is the sum of the two. "Net claims"

on a sector constitute advances or credit less deposits. This summary classification is used by both the Bank of Zambia and the IMF.

12. See Chapter 5 for trends in the world copper industry, and Chapter 6 for the effects on the Zambian mining companies.

13. Defined here as any borrowing in excess of twelve months maturity.

14. See Chapter 2 for a fuller discussion of this trend.

15. These losses would cause "savings" by the corporate sector to be negative.

16. These countries were Ghana (57.6 per cent), Zaire (39.45 per cent), Mauritius (37.0 per cent) and Syria (36.5 per cent), and only Ghana substantially in excess of the Zambian figure of 36.1 per cent.

17. See Chapter 5.

18. The pre-1970 system is described in Harvey (1972) who also cites many of the reasons for its abandonment. Briefly the system was as follows: the royalty R was charged according to the formula (expressed in kwacha).

$$R = 0.135 P - 16$$

where P is the price of copper per long ton.

This formula had not been changed since the 1930s and might have been appropriate to the then current cost structure (the formula implied that no royalty would be paid if the price fell below K 118.52 per long ton) but had no bearing on the production costs of the late 1960s. The export tax was introduced in 1966 and was charged on copper exported at the rate of 40 per cent on that portion of the copper price in excess of K 600 per long ton. Since almost all production is exported this too was a tax on production but it was at least more realistically related to the cost structure of the 1960s.

19. The acute financial crisis which the industry faced in the late 1970s was outlined in Chapter 6.

20. The term is also used to cover Estate duties which are strictly a tax on wealth. The amounts involved are negligible.

21. The Zambian Selective Employment Tax (SET) was thus very different from the SET employed in the United Kingdom which was designed to discourage the drift of labour from manufacturing into the service sectors. The Zambian SET was introduced in support of the Zambianization programme and did not discriminate among sectors, except that certain essential jobs were exempted.

22. The full results were:

$$T = -5.95 + 1.504 Y$$

$$R^2 = 0.9560$$

$$t_b = 16.15$$

$$F = 260.8$$

Data calculated from Appendix S, Tables S.1.1 and S.7.

23. Sources same as footnote 22. In 1966 the proportion of income tax in non-mineral GDP was 4.4 per cent rising to 10.8 in 1973. Thereafter it fluctuated within the range of 9.9 to 11.2 per cent, around a mean of 10.6 per cent for 1973-79. In 1979 the proportion was 10.6 per cent.

24. For instance see the revenue measures in any of the Budget Addresses from 1975 to 1980.

25. Unpublished data in the Ministry of Finance supported this contention.

26. Sales tax (imports) is levied on goods subject to customs (import) duty. Sales tax (domestic) is levied on specified items produced locally. The latter group is effectively a subset of the former, and is therefore not discriminated against.

27. It is believed that this was the conclusion of an unpublished report by an acknowledged expert on fiscal affairs submitted to the government.

28. For instance in 1979 local authorities paid K 0.7 million in interest against the K 5.5 million officially estimated as being due. The largest shortfall is in the parastatal sector: at the end of 1979 statutory boards, corporations and companies showed accumulated arrears on interest of K 50.2 million (all figures from Government of Zambia Financial Report 1979, Lusaka: Ministry of Finance 1980).

29. A minor example of this appeared in the 1979 Budget Address when the film censorship certificate fee was increased one hundred fold from K 0.25 to K 25.00, the first adjustment in 30 years.

30. The tax extension ratio is a rather more flexible measure than the income elasticity of taxation, since the latter requires a greater number of observations to ensure a "reasonable" fit.

31. The results were not seriously distorted as being representative of LDCs by the presence of 4 developed nations. For 36 LDCs the mean value for the ratio was 22.8. The range of values was large: from 11.6 per cent for Japan to 75.1 per cent for Kuwait.

32. See Chelliah, Baas and Kelly (1975).

33. The IMF's GFS Yearbook adopts different definitions of these indirect taxes to that used in this study. The present author regards the sales tax on imports as a tax on international trade; the Yearbook takes this to be a tax on domestic goods. Even correcting for this (which approximately doubles the share of taxes on international trade) the conclusion is not affected.
34. There is no scheme operated by the government hence the very low proportion of expenditure devoted to this purpose (see Table S.7.12) However a limited system is offered by a parastatal organisation - the Zambia National Provident Fund which is wholly owned by the government.
35. This is obtained by deducting all debt charges from the category "Constitutional and Statutory expenditure" in Appendix S, Table S.7.1.
36. That is excluding net movements on the item "other funds and accounts" (see Table S.7.1) which represents "below the line" transactions.
37. That is expenditure on gross capital formation and the acquisition of fixed assets.
38. Consisting of long-term lending approved by Parliament, and extra-budgetary short-term lending which requires no parliamentary approval. The latter is extended for periods not exceeding 12 months, though in practice repeated "roll-overs" are granted.
39. It should be noted that "Net lending" shows a very sharp fall because of the use of a geometric mean growth rate which ignores variations between the initial year and final year when the values for this aggregate were exceptionally high and low respectively.
40. J.M. Mwanakatwe, Budget Address 1978, paragraph 142.
41. This sector includes all companies wholly or partly owned by the state either directly or through one of its holding companies.
42. See footnote 1 to Statement L (page 499) of the Republic of Zambia, Financial Report 1979.
43. Kaunda (1975), p. 37.
44. Price control was not so rigidly enforced on breakfast meal in 1972 and the then current price may be taken to represent a fair indication of a market price at which viable production could occur. The average mark-up was 29 per cent.
45. See ZIMCO Annual Reports 1979 and 1980. In 1978/79 three of the remaining six non-mining non-financial groups of companies also made combined losses.

46. For instance in 1979 87 per cent of internal guarantees and all external guarantees had been issued with respect to borrowing by parastatal organisations. 75 per cent of all long-term government loans had been extended to this sector together with all short-term loans. Where other sectors were involved they were almost entirely local authorities or cooperative societies. (Estimated from Government of Zambia, Financial Report 1979, Statement L and Appendices 1 and 3).
47. This nationalization exercise and the financial operations concerning the ZIMCO bond issues were outlined more fully in Chapter 6, Section 6.1.
48. It was noted in Section 8.1 that central bank credit creates the highest potential for expansion of the money supply.
49. No attempt was made to prepare an independent functional classification of expenditure, partly because of the length of time needed to calculate this from original sources; partly because the IMF has yet to publish its manual on such classifications; and partly because the available evidence did not suggest that significant advantage would result from such a classification.
50. For instance the Tanzania-Zambia Railway, and expansion of power generation capacity at Kafue and Kariba.
51. This was the title of their third chapter.
52. See A.B. Chikwanda, Budget Address 1974 (pp. 8 and 9) for the announcement of this measure.
53. Brief mention of this will be found in the 1979 and 1980 budget addresses.
54. Defined as the ratio of total liquid assets to total liabilities to the non-bank public sector.
55. In more than one informal conversation the author had with senior officials in the commercial banking sector, some puzzlement was expressed that the government did not issue such securities. There would seem to have been little reluctance to take these up if they had been offered.
56. Source: Republic of Zambia, Financial Report 1979, Lusaka: Government Printer (Appendix 5, part B).
57. These issues are examined further in Section 8.8.
58. That is covering both short- and long-term securities.
59. Calculated on the interest paid during 1979 as a percentage of debt outstanding at the end of 1978 (from the data of Appendix S, Table S.9.1).

60. The IMF International Financial Statistics Yearbook 1981 (p.56) shows that Eurodollar loans in London averaged 8.73 per cent in 1978, 11.96 per cent in 1979 and 14.36 per cent in 1980.

61. Domestic credit expansion (DCE) is equal to the sum of changes in the banking system's claims on the government sector and its claims on the private domestic non-bank sector. In Figure 8.1 the DCE concept is gross, i.e., without the deduction of government and private sector deposits with the banking system.

62. The narrow definition of money (M_1) was also used as the explanatory variable. Results did not differ significantly from those reported.

63. Minimum liquidity ratios were as follows:

Up to 1972	- 25 per cent
1972-76	- 28 per cent
1976 onwards	- 30 per cent

In addition there were reserve requirements of 8 per cent and 3 per cent on demand and time deposits until 1972, which, in 1976 were raised to 12 and 8 per cent respectively.

64. In 1981 interest rates on Treasury bills were raised to 6.5 per cent thus going some way toward this policy target.

9.1 Introduction

"Foreign debt is the dark reverse side of foreign aid" (Payer, 1974, page 39). The question which must be addressed is whether the cost to an economy of incurring a 'substantial' burden of foreign debt is justified by the benefits which accrue from resorting to external borrowing to assist in financing economic development. Thus we must explore the reasons why countries borrow from abroad and, given that they do, what principles should guide the management of the resulting debt, and also whether there are any limits to the amount of debt outstanding or to the cost of debt service. A brief review of some of these issues is made in section 9.2, followed by a summary of the overall indebtedness of the less developed countries. The remainder of the chapter is devoted to a more detailed analysis of Zambia's external indebtedness, and an attempt is made to examine whether Zambia has a debt "problem" in the usual sense of having incurred too high a level of external indebtedness or an unmanageable maturity structure, or whether in fact the question lacks relevance in the Zambian context. In order to do this international comparisons are made, both with aggregated regional or income groupings and with individual countries which have experienced severe debt servicing problems: those chosen are countries which sought formal renegotiations of their repayments in the latter part of the 1970s, the period in which Zambia experienced its foreign currency crisis. The chapter concludes with the examination of a problem that appears

to have received little attention to date: that extensive use of IMF facilities by some countries may lead to debt servicing problems with the IMF as the main creditor affected.

9.2 The need to borrow

Dhonte (1979, page 57) suggests that there are those who would argue that "the best debt is no debt at all", though he implicitly rejects this approach. Similarly, in the work cited above Payer (1974) argues that "aid" is the necessary concomitant of the process of trade liberalisation: most LDCs cannot afford to dismantle controls on imports and other foreign payments. Thus foreign financial flows (particularly those from the IMF) are seen by Payer as a means towards achieving the object of complete trade liberalisation. Payer's argument is developed in the context of a critique of the IMF, and the criticism of IMF financial assistance and associated "conditionality" may well be valid. But it is suggested that most countries use IMF funds only as a last resort; thus the IMF is not a part or cause of the initial accumulation of indebtedness, and the linkage between other forms of assistance and liberalisation measures is rather more tenuous.

There may well be some virtue in avoiding the status of a debtor, but the arguments in favour of this would be essentially political - the preservation of national sovereignty and autonomy - rather than economic in the positive technical sense. The dual gap model of development finance formulated by Chenery and Strout (1979) and introduced in section 1.2 and Appendix I.2 suggests that foreign borrowing is an essential part of the process of financing development,

required to supplement domestic savings. As was noted this use of foreign resources need not be a permanent part of the accumulation process: if the marginal domestic savings ratio is greater than the investment ratio required by a given target growth rate then there will come a time when the net inward transfer of resources to the economy can cease, and eventually be reversed (1).

Dhonte's discussion gives rise to several qualifications of this simplistic model. Firstly, the time period over which the net transfer can reasonably be expected to be reversed is a very long one - longer than the life time of any individual loan. This immediately raises the issue of refinancing debt - if the maturity of the original loan is not sufficient to last the full length of the development cycle, then creditors must be prepared to roll over loans as a normal part of operations in developing countries. Loser (1977) has taken a strong specific position on this, suggesting that borrowers should manage their debt so as to maximize the net transfer subject to maintaining their creditworthiness with potential or existing lenders. Secondly there is a risk that foreign capital might substitute for domestic savings, but Dhonte's conclusion is that although some "leaks" of this type might occur, the empirical evidence does not point to a significant reduction in the mobilisation of domestic resources in countries which have made extensive use of foreign aid (Dhonte, 1979, p. 59). Thirdly there is the possibility that foreign aid might affect foreign trade, since the availability of additional foreign resources may lead to the overvaluation of the exchange rate, thus encouraging imports and depressing exports. However, this

problem is almost certainly less serious in Zambia than in many other developing countries, because the value of output of exportable commodities (largely minerals) is determined exogenously (i.e., by the effect on prices of world economic activity and international commodity exchanges), or put another way the price elasticity of supply of exports is very low.

It will be seen in the next section that one of the main causes of the increase during the 1970s was the growth of the collective payments deficits of the developing countries in the wake of the oil price revolution; that is the increase was, at least in part, determined by an externally induced deterioration in their balance of payments. The issue for most developing countries became not whether, but how much, they could or should borrow, and it is this extremely complex issue to which attention is now turned.

Among the tools of analysis used in assessing the extent of individual countries' indebtedness are a wide range of ratios or indicators; these are defined in Appendix IX.1 and no further explanation of the meaning of the terms is given in the text. These indicators are commonly used (singly or in various combinations) to assess countries' borrowing capacity or debt servicing capacity. A most useful analysis using ten of these indicators has been developed by Dhonte (1975 and 1979), based on principal components analysis, which suggests that there are two broad classes of indicators, one measuring the extent of exposure to debt, and the other providing information on roll-over conditions (2). However, such analyses are essentially passive, and on their own do not provide an

explanation of the process of debt accumulation, merely the ability of a country to sustain or increase a given level of indebtedness. The model developed in the following paragraphs is based on the concept of the dual resource gap first introduced in Chapter 1, and is similar in some respects to models which have been used by a number of other authors (3).

The model is based on the nominal national accounting identities and may be cast in either current or constant prices: departing from conventional practice, current prices are adopted. Another point of departure is that imports are introduced as a function of exports, rather than of national output (4). In addition, the model is developed for two cases: one in which the domestic resource gap is effective (the norm in similar models) and the other for a dominant foreign resource gap.

Symbols used are as follows:

<u>Variables:</u>	Y	-	Gross domestic product
	C	-	Total final consumption expenditure
	I	-	Gross fixed capital formation
	X	-	Exports of goods and non-factor services
	M	-	Imports of goods and non-factor services
	S	-	Domestic savings
	D	-	External debt outstanding and disbursed
	F	-	Gross inflow of foreign loans
	A	-	Amortization
	DS	-	Debt service

- Parameters:
- c - Marginal propensity to consume
 - s - Savings ratio
 - k - Incremental capital output ratio (ICOR)
 - i - "Average" annual rate of interest on foreign loans
 - g - Growth rate of GDP
 - x - Growth rate of exports
 - a - Autonomous imports
 - b - Elasticity of imports with respect to exports
 - t - Time period t
 - Y_0 - GDP at period 0
 - X_0 - Exports at period 0
 - T - The length in years of the amortization period

Model specification: The starting point is the national accounting identity

$$Y = C + I + X - M \quad (9.1)$$

and it is assumed that Y follows an exponential trend:

$$Y_t = Y_0 e^{gt} \quad (9.1a)$$

Consumption is a fixed proportion of Y:

$$C = cY \quad (9.2)$$

and savings are thus defined as

$$S = Y - cY = (1-c)Y = sY \quad (9.3)$$

The investment required for a given level of output is:

$$I = kgY \quad (9.4)$$

Unlike Feder (1980) no distinction is made between domestic and imported capital.

Imports are assumed to be determined by exports in a functional relationship with constant elasticity:

$$M = a X^b \quad (9.5)$$

Net borrowing is:

$$\Delta D = F - A \quad (9.6)$$

and is equal to the import gap adjusted for payments of interest on previously outstanding debt

$$\Delta D = F - A = M - X + i D_{-1} \quad (9.7)$$

Because of the ex-post identity of domestic and foreign resource gaps (which may be derived from (9.1) and (9.3) it is also true that

$$\Delta D = F - A = I - S + i D_{-1} \quad (9.8)$$

From this point a continuous time (as opposed to a discrete time) formulation is used so that for any variable V , then $\Delta V \approx \frac{dV}{dt}$ and $V_t \approx V_{t-1}$, when individual time intervals are small relative to the whole period under study.

Formulation (a) - Dominant domestic resource gap

Equations (9.1a), (9.3), (9.4), and (9.8) may be rearranged to give

$$\frac{dD}{dt} = (kg - s) Y_0 e^{gt} + i D \quad (9.9)$$

The solution to the differential equation (8.9) (5) yields the time pattern of debt accumulation:

$$D_t = \frac{kg - s}{g - i} Y_0 (e^{gt} - e^{it}) \quad (9.10)$$

It is now possible to define certain conditions for the debt/GDP ratio to approach an asymptotic limit (6):

$$\lim_{t \rightarrow \infty} \frac{D_t}{Y_t} = \frac{kg - s}{g - i} \quad (9.11)$$

The limit in (9.11) holds only if the rate of growth of GDP exceeds the rate of interest on external debt; the time period within which the ratio approaches the limit will depend on the difference between these two rates (7). If the interest rate is higher than the rate of growth then there is no limit to the debt/GDP ratio in this formulation of the model. These conclusions hold true only if the proportional investment-savings gap ($kg - s$) is constant over time; if this varies then the analysis is complicated. However, it is possible to see that if this domestic resource gap narrows then the pace of debt accumulation will decrease; if domestic savings rise sufficiently to exceed investment then decumulation of outstanding debt will commence.

Formulation (b) - Dominant foreign resource gap

Formulation (a) represents a variation on models found throughout the literature on debt accumulation. The following is unusual in that it considers a dominant foreign resource gap in a country where imports are limited by the volume of exports.

It is assumed that exports follow an exponential trend; thus

$$X_t = X_0 e^{xt} \quad (9.12)$$

From (9.7) and (9.12), using the continuous time formulation, we have

$$\frac{dD}{dt} = a X_0^b e^{bxt} - X_0 e^{xt} + iD \quad (9.13)$$

which is a differential equation, yielding the solution (8):

$$D_t = \frac{a X_0^b}{bx - i} (e^{bxt} - e^{it}) - \frac{X_0}{g - i} (e^{xt} - e^{it}) \quad (9.14)$$

This may now be manipulated to illustrate the asymptotic limits

towards which the debt/export ratio will converge to the following (9):

$$\lim_{t \rightarrow \infty} \frac{D_t}{X_t} = \frac{a X_t^{b-1}}{bx - i} - \frac{1}{x - i} = \frac{M/X}{bx - i} - \frac{1}{x - i} \quad (9.15)$$

The condition for (9.15) to hold is that $x > i$, that is the rate of growth of exports should exceed the interest rate. If this condition does not hold then in terms of this formulation, there is no limit to the growth of the debt/export ratio.

Equation (9.15) is most easily interpreted in the special case in which $b = 1$, so that the limit becomes

$$\lim_{t \rightarrow \infty} \frac{D_t}{X_t} = \frac{M/X-1}{x-i} \quad (9.16)$$

Debt accumulation is seen to depend not only on the relationship between export growth and interest rates, but also the ratio M/X which is the ratio of imports to exports. If this is assumed to be constant then a stable debt/export ratio may be approached; but it may be interpreted to show that if the foreign resource gap widens then the need for additional borrowing increases. Conversely if and only if the foreign resource gap disappears can the process of debt decumulation commence.

The limit given by equation (9.15) is an unstable one; it is sensitive to small changes in b when, as is probable, $b < 1$. Indeed for values of $bx < i$ the relationship cannot be interpreted normally, since the denominator becomes negative, and perhaps the only valid conclusion which may be drawn is that if a limit is to be achieved to the debt/exports ratio then a very high rate of growth of exports must be consistently realized.

Formulation (c) - The debt service constraint

Assuming that all loans are amortized over a standard period of T years, then by definition, debt service is given by

$$DS_t = A_t + iD_{t-1} = \frac{(1+iT)}{T} D_{t-1} \quad (9.17)$$

Dividing throughout by X and rearranging we have

$$\frac{D_t-1}{X_t} = \frac{T}{1+iT} \cdot \frac{DS_t}{X_t} \quad (9.18)$$

Assume that there is some externally given or perceived maximum debt service d^* , ratio which will apply at any time; then the limit for debt accumulation will be given by

$$\lim_{t \rightarrow \infty} \frac{D_t-1}{X_t} = \lim_{t \rightarrow \infty} \frac{D_t}{X_t} = \frac{T}{1+iT} d^* \quad (9.19)$$

This presentation allows the debt/exports ratio to be related to the terms of borrowing and to an assessment (by the country's government or by external creditors) of a maximum sustainable debt service ratio. Thus the subjective element of assessing risk to borrowers is preserved: although it is frequently suggested that a debt service ratio of 20 per cent is the maximum within which a country can live comfortably, there is no a priori justification for such an assertion. Equation (9.19) also shows why the debt service ratio is inadequate on its own as an indicator of exposure, since the maximum debt/export ratio is influenced by the term $\frac{T}{1+iT}$. A further sophistication would be to allow for declining terms of borrowing by expressing i and T as functions of time. This is not attempted here.

In summary debt accumulation has been explained by three different processes which may limit its level:

- (i) the domestic resource gap, provided that output growth at a rate greater than the rate of interest;

- (ii) the foreign resource gap, provided that the rate of growth of exports is greater than the interest rate (with an added complication where the elasticity of demand for imports with respect to exports is less than unity); and
- (iii) a combination of the perceived maximum debt service ratio and appropriate terms of borrowing.

This conclusion is profoundly pessimistic for Zambia, where the foreign resource gap is dominant. The low growth rate of exports, combined with a low elasticity of imports with respect to exports (see chapter 7), imply that there is probably no limit to the country's need to accumulate foreign debt.

The model discussed is based upon the assumption that the foreign or domestic resource gaps are financed by foreign borrowing. This is an abstraction from reality and Table 9.1 allows an assessment to be made of the extent to which this is true. There are two principal types of financing which are not directly covered in the discussion above: grants and direct investment. The former are not distinguished in Table 9.1; the latter are seen to have been growing in importance. In 1970 private direct and bilateral portfolio investment accounted for 27 per cent of total long-term financing; in 1974 and 1977 the proportion rose to 38 per cent. Another important source of financing of current account deficits can be the decumulation of reserves. Thus the model presented above represents only a partial explanation of resource gaps.

Table 9.1 Sources of financing of current account deficits of developing countries (excluding petroleum producers).

(Billion US dollars)

	1970	1974	1977
1. <u>Current account deficit</u>	<u>-10.8</u>	<u>-32.2</u>	<u>-27.8</u>
2. <u>Long-term financing</u>	<u>11.1</u>	<u>27.7</u>	<u>42.7</u>
<u>Bilateral (a)</u>	<u>9.3</u>	<u>23.6</u>	<u>35.6</u>
ODA (b)	4.0	7.9	9.1
DAC (c)	3.5	5.0	5.5
OPEC (d)	0.5	2.9	3.6
Other official	0.6	1.9	2.1
DAC (c)	0.6	1.2	1.3
OPEC (d)	0.1	0.7	0.7
Private	4.6	12.1	20.5
Direct investment	2.6	7.6	8.0
Export credits	1.6	1.5	4.5
Bilateral portfolio investment	0.4	3.0	8.0
Other bank lending	0.1	1.8	4.0
<u>Multilateral</u>	<u>1.2</u>	<u>3.4</u>	<u>6.5</u>
ODA	0.6	1.9	4.0
DAC (c)	0.6	1.8	2.5
OPEC (d)	--	0.1	1.5
Other official	0.6	1.5	2.6
DAC (c)	0.6	1.5	2.2
OPEC (d)	--	--	0.4
<u>Socialist countries</u>	<u>0.5</u>	<u>0.7</u>	<u>0.5</u>
3. <u>Short-term financing (and errors and omissions)</u>	<u>2.3</u>	<u>6.4</u>	<u>-3.4</u>
4. <u>Reserves and related items (e)</u>	<u>-2.7</u>	<u>-1.9</u>	<u>-11.4</u>

Source: UNCTAD, Handbook of International Trade and Development Statistics, 1979, (Table 5.3).

- (a) Originating from countries within the group shown.
(b) Official Development Assistance.
(c) Development Assistance Committee: Australia, Austria, Belgium, Canada, Denmark, France, Germany (F.R.), Italy, Japan, Netherlands, Norway, Portugal, Sweden, Switzerland, U.K., U.S.A.
(d) Organisation of Petroleum Exporting Countries.
(e) Negative sign indicates increase in reserves.

9.3 International indebtedness in the 1970s

The indebtedness of the developing countries and the reasons for its growth during the 1970s has been extensively documented. Two comprehensive studies of the debt process in previous years viewed from both theoretical and empirical standpoints were prepared by Avramovic and others (1964) and Ohlin (1966). More recent studies which have focussed on the empirical and policy-oriented issues have been Abbott (1979), Beim (1977), Cleveland and Brittan (1977), Dhonte (1975 and 1979), Duff and Peacock (1978), Feder (1980), Hallwood (1980), Hope (1981), the International Monetary Fund (May 1981) and Loser (1977) with Payer (1974) providing a more specific survey related to the IMF's role in the process of indebtedness (10). In view of the extensive literature on the general problems of indebtedness in the developing countries, it would be superfluous to attempt any further detailed analysis. The few comparisons made in this section have a dual purpose: to re-emphasize the great variation which exists among the developing debtor nations and to enable a preliminary comparison of Zambia's indebtedness with that of some major country groupings.

The experience of the developing countries has been most succinctly summarized by Hope (1981):

"The 1970s witnessed a very rapid build-up of the external debt of developing countries, accompanied by a pronounced shift away from official (especially bilateral) and towards private capital, mainly from the commercial banks. As a result, developing countries were aided in maintaining (comparatively) high growth during the adjustment phase in the middle of the decade. A concomitant of the shift in the source

of foreign borrowing has been a hardening of the average terms for foreign debt (but the terms for private debt financing did not harden appreciably through 1979). At the same time debt has been a substitute for other forms of capital, so that increased debt service payments have been offset partially by a (proportional) fall in other capital service payments." (Hope, 1981, pp. 53-4).

Hope's conclusions also lead him to make several other generalisations. He suggests that there was no systematic deterioration in the external position of the developing countries during the 1970s, when they are taken as a whole. The concentration or distribution of debt, according to Hope, did not change significantly during the decade, although there was some evidence that official credit became more diversified with the poorer, less creditworthy countries being the main beneficiaries. However his conclusion is the fairly pessimistic one that the developing countries are more constrained in their ability to finance necessary structural adjustments through external borrowing than they were in the mid-1970s because of the absence of a "boom" in commodity prices in the early 1980s: the oil price revolution which triggered the need for structural change in so many developing countries, coincided with the very rapid increase in the prices of some primary commodities (11).

Having noted these generalisations it is once again necessary to stress that the experience of the developing countries has not been homogeneous and the limited empirical data in this section will demonstrate the extent to which this is true. Consider Table 9.2; the fastest growth of debt outstanding was recorded by the oil exporting countries, even though it is commonly supposed that these

Table 9.2. Trend growth rates of public and publicly guaranteed external debt outstanding, 1974-79

(Percentages)

	Total (n=97)	Upper middle income(a) (n=8)	Inter- mediate middle income(b) (n=35)	Lower middle income(c) (n=26)	Low income (d)(f) (n=29)	Non-oil coun- tries (n=80)	Oil ex- porting coun- tries (n=17)	Zambia
Amounts owed to								
<u>All lenders</u>	<u>23.3</u>	<u>20.1</u>	<u>27.0</u>	<u>25.3</u>	<u>12.9</u> (17.8)	<u>20.8</u>	<u>29.0</u>	<u>15.5</u>
<u>Official creditors</u>	<u>17.0</u>	<u>17.6</u>	<u>16.4</u>	<u>22.9</u>	<u>12.9</u> (18.1)	<u>15.6</u>	<u>21.4</u>	<u>22.9</u>
Governments	14.9	18.8	14.6	19.2	10.5	13.3	19.6	21.5
International organizations	22.7	11.0	19.7	36.3	19.7	21.5	27.1	25.3
<u>Private creditors</u>	<u>31.0</u>	<u>22.0</u>	<u>34.2</u>	<u>29.8</u>	<u>13.5</u> (15.2)	<u>28.7</u>	<u>34.8</u>	<u>6.6</u>
Suppliers' credit	13.7	19.5	15.3	15.0	7.3	13.0	15.0	24.0
Total financial markets	37.4	24.0	40.0	43.6	20.9	34.3	42.4	0.5
(Financial institutions)	(39.9)	(33.2)	(40.7)	(44.7)	(23.8)	(37.6)	(43.2)	(1.4)
(Bonds)	(25.3)	(12.3)	(54.0)	(34.9)	(-13.8)	(21.4)	(36.7)	(-8.7)
Other (e)	-1.4	...	11.3	-17.3	3.4	-0.3	-1.9	--

Source: Calculated from World Bank World Debt Tables 1980 (EC-167/80), Tables 1-A to 1-J, pages 1 to 20.

(a) 1978 per capita GNP \$3,000-\$6,999.

(b) 1978 per capita GNP \$700-\$2,999.

(c) 1978 per capita GNP \$300-\$699 (includes Zambia).

(d) 1978 per capita GNP less than \$300.

(e) "Debt on account of nationalized properties, and unclassified debts."

(f) Numbers in brackets exclude India.

countries have accumulated substantial surpluses (12). Almost equally rapid growth occurred in the case of the intermediate and lower middle income countries, the former of these two groups being heavily influenced by the borrowing of such countries as Brazil and Mexico which have undertaken extensive borrowing from the international banking system. Although the low income group showed the slowest overall rate of growth, it is evident that this differential is exaggerated by the experience of one country in the group: India. The removal of India from the calculation of the growth rate of indebtedness to all external lenders added 5 percentage points to the trend (annual) growth rate for the group. Another feature is the significantly faster rate of growth of indebtedness to private creditors, particularly those in the financial markets. By far the largest portion of the absolute growth in this category was in borrowing from the financial institutions, since, as reference to Table 9.3 will show, the relative level of financing from bond flotation formed a very small proportion of total indebtedness. Lending by private creditors increased least rapidly in the low income countries, doubtlessly a reflection of the lower creditworthiness of these countries among the commercial banks.

Table 9.3 shows rather more clearly the extent to which the debt of individual groups is concentrated by particular types of lender. The poorest countries are seen to rely most heavily on official credit, especially that from governments (i.e., on bilateral terms) largely because of the more favourable terms which attach to this type of borrowing. The data for international organisations

Table 9.3. Structure of LDCs' external debt outstanding by type of creditor: 1979

(Percentages)

Amounts owed to	Total	Upper middle income(a)	Inter-mediate middle income(b)	Lower middle income(c)	Low income (d)(f)	Non-oil countries	Oil exporting countries	Zambia
<u>All lenders</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u> (100.0)	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
<u>Official creditors</u>	<u>45.6</u>	<u>41.0</u>	<u>29.6</u>	<u>61.0</u>	<u>89.6</u> (84.1)	<u>51.3</u>	<u>34.9</u>	<u>69.0</u>
Governments	31.1	35.9	18.5	42.6	61.3 (58.9)	34.4	24.9	45.9
International organizations	14.5	4.7	11.1	18.5	28.3 (25.2)	17.0	9.9	23.2
<u>Private creditors</u>	<u>54.3</u>	<u>59.0</u>	<u>70.4</u>	<u>39.0</u>	<u>10.2</u> (15.5)	<u>48.7</u>	<u>65.0</u>	<u>31.0</u>
Suppliers' credit	7.2	2.7	8.3	8.1	4.4 (6.2)	6.7	8.2	11.7
Financial markets - total	46.7	56.3	61.7	30.4	5.8 (8.9)	41.7	56.2	19.2
(Financial institutions)	(41.5)	(39.1)	(56.0)	(27.9)	(5.6) (8.5)	(36.2)	(51.4)	(18.2)
(Bonds)	(5.2)	(17.2)	(5.7)	(2.3)	(0.2) (0.4)	(5.5)	(4.7)	(1.1)
Other (e)	0.4	--	0.5	0.5	-- (--)	0.3	0.6	--
<u>Memorandum items:</u>								
Proportion of total debt owed by country group)- 1974	100.0	10.1	46.9	19.7	23.3 (11.3)	72.5	27.5	0.8
Proportion of total GNP (1979)	100.0	15.9	53.2	17.2	13.8 (5.0)	75.4	24.6	0.2
Proportion of total population (1979)	100.0	2.8	23.8	23.8	50.2 (19.0)	79.9	20.1	0.3

Source: Debt - calculated from World Bank World Debt Tables 1980 (EC-167/80) Tables 1-A to 1-J, pages 1-20. GNP and population - calculated from World Bank Atlas 1979, Washington, World Bank.

- (a) 1978 per capita GNP \$3,000-\$6,999.
 (b) 1978 per capita GNP \$700-\$2,999.
 (c) 1978 per capita GNP \$300-\$699 (includes Zambia).
 (d) 1978 per capita GNP less than \$300.
 (e) "Debt on account of nationalized properties and unclassified debts."
 (f) Number in brackets exclude India.

is heavily weighted by credit from the World Bank which is by far the largest of the multilateral financial institutions, and since the main part of its lending carries market-related terms, use of credit from this source is strictly limited by considerations of creditworthiness and debt servicing capacity. Table 9.3 shows very clearly that there is a strong "graduation" effect - that is, the higher is a country's per capita GNP (a proxy for the level of development) the larger will be its relative use of credit from private sources.

A further significant feature to emerge from Table 9.3 is that the distribution of debt appears to be very closely correlated with the distribution of total GNP, but very poorly related to the distribution of population. That is, in spite of positive attempts by such organisations as the World Bank and some bilateral creditors to increase financial assistance to the poorest nations (and to the poorest individuals within those countries), the principal beneficiaries of international financial flows and development assistance continue to be middle and upper income developing countries (13). The unequal distribution of disbursed debt outstanding is further illustrated by Table 9.4 which shows that of the 97 countries included in the Debtor Reporting System, 13 countries (listed in footnote (b) to the table) accounted for about two thirds of total debt outstanding with a concentration on borrowing from private creditors. The concentration is even more marked when the two largest borrowers, Brazil and Mexico are distinguished; these two countries account for over a fifth of all developing countries' indebtedness and over a

Table 9.4 Relative share of 13 main borrowers
in debt outstanding and debt service (a)

(Percentages)

	Proportionate shares of:		
	13 main borrowers (b)	84 other developing countries	Mexico and Brazil (c)
Debt outstanding and disbursed:			
Total	64.4	33.6	21.8
Official sources	53.0	47.0	6.9
Private sources	71.1	28.9	34.2
Debt service	68.8	31.2	34.3

Source: World Bank World Debt Tables 1980 Vol. I (EC-167/80) Table VIII, p. ix, for first two columns, third column calculated from Tables 1-A, 1-B, 1-E, and 8-A.

(a) Includes World Bank estimates of private non-guaranteed debt.

(b) Algeria, Argentina, Brazil, Chile, Egypt, Greece, India, Indonesia, Israel, Korea, Mexico, Pakistan, Spain, Turkey, Venezuela, Yugoslavia.

(c) Public and public guaranteed debt only.

third of their debt to private sources. Only a small proportion was owed to official sources by these two countries. This concentration is not a problem only for the debtor countries, but during the late 1970s and early 1980s came to be of increasing concern to the financial institutions (mainly banks operating through the Euro-currency markets) which had lent to these countries. Thus in an extensive and comprehensive survey of the issues of default and debt rescheduling The Economist suggested that:

".... if Brazil, Mexico and South Korea all decided in the same year not to pay back their loans to western banks (a not totally inconceivable event) then 100% of the capital and reserves of America's nine biggest banks would be wiped out. They would be technically bust and that would be the end of the international financial system as it is now known."
(The Economist, 20 March 1982, page 64)

Proposals amongst some development analysts (14) that all debt from developing countries should be rescheduled or cancelled tends to meet with little favour from some quarters on both sides: the banks are concerned that they should suffer no financial loss while the higher income (and more highly indebted) countries like Brazil and Mexico do not wish to be identified with the poorer countries and fear that their creditworthiness would thereby be affected.

Further evidence of the heterogeneity of the pattern of indebtedness is provided by Table 9.5. Almost all groups of countries have experienced an increase in the burden of external indebtedness as measured by the ratios of debt outstanding to GNP and exports. It is, therefore, quite clear that the rate of increase of external debt has exceeded that of either GNP or exports, but also that the

Table 9.5 Indicators of public debt outstanding and service ratios:
major country groups (a)

(Expressed as percentages)

	Year	Unweighted indicators			Weighted indicators (b)		
		DSR(c)	DOD(d) GNP	DOD(e) X	DSR(c)	DOD(d) GNP	DOD(e) X
Oil exporting countries	1970	10.7	13.8	81.6	14.4	19.0	126.5
	1979	19.1	25.1	90.7	19.8	33.8	130.3
Low income oil importing countries	1970	13.5	16.1	198.0	22.2	20.0	358.9
	1979	8.5	18.4	147.2	9.0	26.8	168.8
Low income oil importing countries (excluding India)	1970	10.7	18.9	129.3	...	...	...
	1979	10.3	28.1	172.4	10.6	37.3	199.2
Middle income oil importing countries:							
Major exporters of manufactures							
	1970	6.9	8.4	50.5	10.7	14.8	91.5
	1979	9.0	12.1	53.7	19.1	19.4	114.1
Middle income oil importing countries:							
Excluding major exporters of manufactures							
	1970	8.4	14.6	78.2	11.5	18.3	110.7
	1979	12.5	22.1	94.1	15.4	30.6	131.2

Source: Hope (1981) Table A, pp. 56-64.

(a) Country groups are described in Hope (1981) Appendix 2. The basis of the classification was not described.

(b) Weighted by shares of individual countries, in total debt outstanding of the group.

(c) Debt service ratio (debt service divided by exports of goods and services).

(d) Debt outstanding and disbursed as a proportion of GNP.

(e) Debt outstanding and disbursed as a proportion of exports of goods and services.

increase in the value of the ratios has been roughly of the same order (15). Nevertheless there remains considerable variation among countries: it may be deduced that lower income countries with a relatively low degree of 'openness' (16) have a rather higher level of indebtedness relative to exports than do those developing countries which are major exporters of manufactured goods. But is the latter group for which the cost of debt servicing has increased most sharply relative to export earnings, again a reflection of the rapidly growing use of private credit by these countries (among which are found Brazil, Mexico, and South Korea).

In the period 1973 to 1979 the terms of new loan commitments deteriorated for the developing countries taken together (see Table 9.6). But it was not just the higher income countries (such as in Latin America, the Middle East and the Mediterranean) which suffered a fall in the grant element (17); indeed it was only the South Asian group (which would be heavily weighted by India) which saw an improvement in the terms of new borrowing. Thus even the lower income regions such as Africa south of the Sahara, and East Asia and the Pacific experienced quite marked variations although the decline did not come in the same year in these two regions. The decline in the grant element reflects both rising interest rates and shortening maturity periods (as seen in Table 9.6), and also is a result of shortening grace periods (18) and other concealed changes in terms such as the switch by the World Bank from an annuity system of payment to a system of equal annual payments of principal (19).

Table 9.6 Average terms of loan commitments: major country groups and Zambia, 1973-79

	Africa South of the Sahara	East Asia and Pacific	Latin America and Caribbean	North Africa and Middle East	South Asia	Mediterranean countries	Grand total	Zambia
(Per cent per annum)								
Interest								
1973	5.4	6.4	8.3	7.2	2.5	6.4	6.7	8.3
1974	5.2	7.7	9.2	5.9	2.7	8.2	7.1	5.7
1975	5.7	8.3	8.3	6.0	2.5	7.7	6.9	7.8
1976	5.4	7.8	7.5	6.2	3.5	6.8	6.8	6.9
1977	5.5	7.6	8.0	6.2	2.7	7.1	6.9	6.5
1978	6.4	8.0	9.5	7.1	2.0	7.8	7.9	5.5
1979	7.9	8.7	11.2	8.2	2.4	10.3	9.6	...
(Years)								
Maturity								
1973	20.4	20.8	13.5	17.9	31.6	19.0	18.6	17.5
1974	20.0	16.8	12.3	18.0	28.2	16.5	17.2	18.1
1975	20.3	12.5	10.0	16.1	32.2	16.0	15.5	10.5
1976	19.1	13.9	10.3	17.0	27.8	16.5	14.6	17.0
1977	19.0	13.8	9.2	15.1	34.2	15.2	14.2	19.5
1978	17.5	15.1	10.1	15.0	38.0	15.2	14.6	24.0
1979	16.5	15.0	10.1	16.0	34.9	14.0	14.0	...
(As a percentage of loan value)								
Grant element (a)								
1973	33	28	9	19	58	26	23	13
1974	34	16	5	26	56	15	20	29
1975	30	10	8	25	60	15	20	11
1976	31	12	11	24	50	19	19	20
1977	30	13	8	23	60	17	18	26
1978	25	13	3	19	67	14	14	39
1979	17	10	-4	13	62	3	6	...

Source: World Bank Annual Report 1981 (p. 143).

(a) See Appendix IX.1 for definition.

There are several respects in which Zambia's experience differed from the general patterns which have been observed in the discussion of Tables 9.2, 9.3, and 9.6. In terms of the classification used in the first two of these tables, Zambia falls into the lower middle income group of countries, but the behaviour of its debt outstanding appears to be atypical of any of the categories. The growth of its total debt outstanding was considerably below the average, largely a result of the slow growth of debt from private sources. The structure of its debt (Table 9.3) falls between the averages for the lower middle income and low income groups, with a substantial majority of its debt owed to official creditors. The 1979 level of debt from the international financial markets is very significantly lower than other middle income countries, but it has made rather more extensive use of suppliers' credits than any other group. This latter may be a result of the particular problems Zambia has encountered with respect to its arrears on external payments - importers have tended to seek a rather higher level of long-term suppliers' credit than is normal. The negative growth rate (in Table 9.2) of "Bonds" is due to the redemption of the ZIMCO bonds (20).

It is also of considerable interest to note that the average terms of new loan commitments to Zambia improved markedly during the years from 1973 to 1979, another respect in which Zambia's borrowing is at variance with the other developing countries (particularly those in the middle income groups). This may reflect a recognition by the international aid "community" that Zambia was encountering abnormal economic problems firstly with respect to the very large deterioration

in its terms of trade after 1974 (21), and secondly the particular economic difficulties associated with the operation of sanctions against the Rhodesian regime and the increase of direct conflict between the two countries. Also, as will be seen in the next section, the government made increasing resort to external borrowing, and the improvement in terms would also be a reflection of the official sources which provided these loans; previously private borrowers (for instance the mining companies) would have received loans on commercial conditions.

There can be little doubt that an increasing number of countries are experiencing "debt problems" but what precisely constitutes such a problem is not clear from the limited range of indicators discussed thus far. One of the most common indicators is the debt service ratio and there is evidence in Table 9.5 that this ratio has been rising universally, but as noted in Chapter 1 in the past many countries have been able to sustain ratios as high as 30 or 40 per cent, and there are a number of more recent examples of countries functioning for several years with debt service ratios of about 20 per cent or more (22). A debt problem may not show up as a heavy contractual service obligation, and both Dhonte (1979) and the IMF (May 1981) point to the importance of adequate roll-over conditions (see Appendix IX.1). Thus the IMF analysis suggests that a prominent feature in most problem countries has been an erosion of the international money markets' confidence in the ability of the debtor country's "ability" to manage its economy. Alternatively, it could be argued that wherever instability occurs, whether induced

by internal or external factors, creditors lose confidence. This results in net capital inflows to the country becoming less readily available, that is new credit becomes more scarce and the terms of new commitments may become harder. Thus if a country gets into balance of payments difficulties a vicious circle could be established in which the government reacts to the foreign exchange constraint by adopting more restrictive economic policies; the international financial community interpreting this as a loss of control over the domestic economy reduces the net flow of credit, leading to even more severe external payments problems. Equally those countries which formerly had little or no access to certain financial markets would be even less likely to gain the necessary access when they experience serious balance of payments problems, a time when they most need such credit.

Countries which encounter debt service problems can in practice be identified in various ways, the most obvious of which is resort to debt renegotiations through (for instance) the Paris Club (23). But debt problems may be only one symptom of wider difficulties with the balance of payments, indeed it is quite conceivable for severe disequilibrium to occur in the latter without the country appearing to be in any danger of default on its debt obligations. In subsequent sections a comparison will be made between Zambia which has not defaulted nor sought renegotiation but which has had problems on its current account, and a number of countries which have sought multilateral renegotiation. One of the symptoms which the IMF (May 1981) suggests is common to all the latter groups of countries is

that they have accumulated external payments arrears before renegotiation, and this may be regarded as an early warning signal.

9.4 Zambian indebtedness: a synopsis

The question to which attention is turned in this and the next section is the role Zambia's external indebtedness has played in the growth of its balance of payments disequilibrium - whether it has exacerbated or reduced the effects of economic instability. In short does Zambia have a "debt problem", the resolution of which would alleviate the financial constraints on its economic growth? Serious difficulties arise in connection with the availability of data, and these are discussed in Appendix IX.3. Unless otherwise stated data used in this chapter are taken from the World Bank's Debtor Reporting System (DRS).

In the previous section it was seen that the growth rate of Zambia's external indebtedness was considerably less than the average for other lower middle income countries. Nevertheless, Table 9.7 shows that a fairly rapid expansion of disbursed debt outstanding occurred during the period 1965-80, although the most rapid growth appears to have been immediately after independence. This latter effect is due to the small base on which the growth rates are calculated, but it is of particular interest to note that formal long-term debt (DOD) did not increase (in terms of current prices) very much faster after 1975 than before that year. This point is emphasized because there were two reasons for supposing a priori that long-term indebtedness should have increased appreciably faster

Table 9.7 Trend growth rates of external indebtedness, trade and GDP:
1965-80 (a)

(Percentages)

	1965-70	1970-75	1975-80	1965-80
Debt outstanding and disbursed (DOD)	24.9	9.0	11.2	19.2
DOD plus arrears and IMF drawings	24.9	13.4	18.3	23.8
Net debt (b)	20.1	28.1	11.0	27.1
Debt outstanding, including undisbursed	33.9	11.4	14.0 (d)	21.9 (d)
Exports (c)	14.1	3.1	14.5	5.5
Imports (c)	11.4	10.0	7.0	8.1
GDP	13.0	7.8	12.4	8.6

Source: calculated from Appendix S, Table S.9.1.

(a) All expressed in current prices.

(b) For full explanation see Appendix S, Table S.9.1 and Appendix IX.1.

(c) Including nontraded current account transactions.

(d) Final year 1979 not 1980.

after 1975: a higher rate of inflation (both domestic and international) and the succession of large current account deficits which were documented in Chapter 7.

One of the problems with the data used herein (see Appendix IX.3) is that they only cover external debt of over 12 months' maturity (thus excluding significant amounts of suppliers' credits), it does not cover drawings from the IMF facilities, even though these have an identical impact on a country's balance of payments and foreign reserve position to any other form of debt, and they provide no means of accounting for arrears on external payments. The second row in Table 9.7 shows growth rates of external debt which have been adjusted to take account of arrears and IMF drawings, but no comprehensive information is available on short-term suppliers' credit. The effect is significant: growth of this adjusted measure is 5 percentage points higher in the five years after 1975 than the previous period, a result more compatible with the a priori reasoning above, and its growth rate is considerably higher after 1970 than that of the more conventional measures, DOD.

A deficiency of the above measure is that it does not take cognisance of another means of financing severe balance of payments deficits, the decumulation of gross foreign reserves. The concept of net debt (24) attempts to combine the effects of using external borrowing and reserve manipulation for the purposes of financing the current account. The growth profile which emerges from the third row of Table 9.7 reflects the rapid decumulation of foreign reserves from 1970 through to 1975 when they had been reduced to minimum

operational levels (25), a process described in Chapter 7, section 7.6. Dhonte (1979) has suggested that one of the reasons why a country with a severe balance of payments disequilibrium may not be able to raise its net external borrowing is that creditors may lose confidence in the country's ability to make the necessary adjustments, and therefore indicate this by reducing their commitments to that country. Table 9.7 does not support this contention, in that the volume of debt outstanding (including undisbursed commitments) has grown consistently faster than the disbursed portion of outstanding indebtedness; thus if Zambia has not increased its drawing on new loans, the reason was not that loans were not forthcoming, and an explanation must lie in the country's "absorptive capacity" for external borrowing.

Reference to the growth rates of exports, imports and gross domestic product show that the growth of external indebtedness has exceeded these over the entire period 1965-80 and in most of the sub-periods. This would suggest that most of the conventional indicators and ratios used to measure the extent and cost of external indebtedness should show a deterioration in Zambia's position. A complete annual series of these indicators and ratios is presented in Appendix S Table S.9.2, and a more easily interpreted selection of averages appears in Table 9.8.

The debt service ratio (averaged over five-year periods) increased very substantially between the two periods 1965-70 and 1976-80, but debt service relative to the volume of debt outstanding

Table 9.8 Average debt ratios: Zambia, 1965-80

(Expressed as percentages)

Ratios (a)		1965-70	1971-75	1976-80
Debt service/exports	$\frac{DS}{X}$	2.4	13.1 (c)	14.9
Debt service/debt outstanding and disbursed	$\frac{DS}{DOD}$	7.3	18.4 (c)	12.7
Debt outstanding and disbursed/exports	$\frac{DOD}{X}$	32.6	71.4	160.3
Debt outstanding and disbursed/GDP	$\frac{DOD}{GDP}$	18.9	32.8	49.0
Net debt/exports	$\frac{ND}{X}$	18.5	81.0	136.2
Disbursements/imports	$\frac{DB}{M}$	11.1	16.1	15.3
Net transfers/imports	$\frac{NT}{M}$	8.3	5.2	2.1
Net transfers/disbursements	$\frac{NT}{DB}$	74.7	32.0	13.6
<u>Memorandum items:</u>				
Ratio of debt outstanding and disbursed, including "monetary authorities liabilities" (b) to:				
Exports	$\frac{DODM}{X}$	32.0	88.6	185.1
Gross domestic product	$\frac{DODM}{GDP}$	18.3	38.6	75.2

Source: Calculated from Appendix S, Table S.9.1.

(a) Calculated as ratios of totals for each period, and expressed as percentages.

(b) Includes arrears on external payments and IMF drawings outstanding.

(c) Inflated by prepayments in 1973 (i.e., of ZIMCO bonds redeemed - see section 6.1)

increased by a very much smaller amount (the former registered more than a sixfold increase while the latter did not even double between the two periods). The increase in the ratio $\frac{DS}{DOD}$ reflects two influences: hardening terms of borrowing, and a rise in the rate of amortization (26). The debt service ratio will also reflect two influences: hardening terms as before, but also a relative decline in the level of exports. The negative influence of exports is also observed in the ratios of debt outstanding and net debt to exports ($\frac{DOD}{X}$ and $\frac{ND}{X}$) which increased five- and seven-fold respectively, whereas the ratio $\frac{DOD}{GDP}$ rose less than threefold. The inclusion of arrears and IMF drawings as a form of external indebtedness increases markedly the factors by which the ratios ($\frac{DODM}{X}$ and $\frac{DODM}{GDP}$) rose over the same period, but the pattern of increase is broadly the same; it is noteworthy that the increase in these unconventional indicators is most rapid in the late 1970s.

Thus it is certainly true that Zambia's debt service and debt/exports ratios rose sharply during the 1970s, but the explanation lies in the decline of Zambia's terms of trade (primarily a result of export unit values) and the failure to achieve either diversification or growth in export volumes. The debt servicing problem became serious (by 1980 it had risen to 21 per cent) but its cause did not lie in excessive external borrowing or in contracting debt at terms which were unmanageable. In both these regards, Zambian experience was notably better than that of other developing countries.

The behaviour of the net transfer and disbursement ratios in Table 9.8 suggest that if Zambia had a debt problem it may have

been one of too little, rather than too much, debt. The ratio $\frac{DB}{M}$ rose slightly between 1965-70 and 1976-80, suggesting that Zambia became rather more dependent on the disbursement of external borrowing to finance its imports. But the net transfer/imports ratio, $\frac{NT}{M}$, declined substantially (by about 75 per cent), evidence that disbursements grew less quickly than total debt service. Thus in the period 1976-80 when large net transfers were warranted by the successive deficits on current account the amounts actually received were relatively smaller than the 1960s when the current account was far stronger. The effect is further reflected by the ratio of net transfers to disbursements, $\frac{NT}{DB}$; in the late 1960s nearly three quarters of loan disbursements represented a net inward transfer, but by the late 1970s this proportion had fallen to about 14 per cent (27).

Table 9.9 allows an assessment of the terms of lending to Zambia to which reference was made above. It was noted in section 9.3 that Zambia fared rather better than the average for most developing countries. There was a steady deterioration in the terms at which new loans were negotiated (as measured by the grant element) between 1965-67 and 1975 (with the exception of 1974) but that thereafter there was a steady improvement. It is suggested that this may have occurred for two reasons: a recognition by the international aid agencies that Zambia was facing particularly difficult conditions even though by the normal criteria of per capita GNP it was not among the poorest countries, and secondly a considerable volume of goodwill and political support extended by the international community in view of the cost to Zambia of sanctions against the illegal regime in Rhodesia until 1979. The effect of this was

Table 9.9 Average terms of loan commitments: Zambia, 1965-79 (a)

	Official creditors (b)		Private creditors (c)		All creditors (d)		
	Amount (e)	Ma-turity element (g) (h)	Amount (e)	Ma-turity element (g) (h)	Amount (e)	Ma-turity element (g) (h)	
1965-67	...	...	...	...	38	15.4	32.0
1968-70	...	...	...	...	141	14.9	21.0
1971-73	...	...	...	...	158	17.7	22.0
1973	255	23.7	185	8.9	440	17.5	12.7
1974	239	20.6	83	10.8	322	5.7	28.5
1975	62	26.3	330	7.5	392	7.8	11.3
1976	118	22.6	78	8.2	196	6.9	19.8
1977	87	25.3	35	9.4	122	6.5	26.2
1978	227	32.9	123	11.1	350	5.5	39.1
1979	197	24.9	45.8	...	...	...	...

Sources: (i) 1965-70 World Bank, External Public Debt (EC-167/71, October 1972, p. 169) mimeograph.

(ii) 1970-73 World Bank, World Debt Tables (EC-167/75, October 1975, p. 261) mimeograph.

(iii) 1973-79 World Debt Tables (EC-167/80, November 1980, p. 183) mimeograph.

(iv) Author's calculations for "All creditors" 1973-80.

(a) Terms on loans contracted during period in question.

(b) Loans from governments and international organisations.

(c) Suppliers' credits, private bank credit, bond flotations and other obligations.

(d) Sum of (b) and (c). For 1973-80 calculated as the simple weighted average (using amount as weight).

(e) In U.S. dollars; totals may differ from other tables because of exchange rate variations and cancellations

(f) Per cent per annum.

(g) In years.

(h) See Appendix IX.1 for definition.

a very pronounced fall in the average rate of interest on new loan commitments from official creditors from 1978, and a less easily perceived increase in the maturity of these loans. The improvement in terms is entirely on account of official creditors changing their policy towards Zambia; private creditors' terms became harder during the 1970s.

Another reason for the pronounced improvement in the overall terms of lending was that the balance between official and private creditors shifted towards the former during the 1970s, a process tabulated in Table 9.10. In 1970 official creditors accounted for 23 per cent of total outstanding debt, and by 1979 this proportion had risen to 69 per cent. The major part of this increase is accounted for by bilateral inflows: until 1971 "Governments" accounted for no more than one half of total official borrowing in 1970, a proportion which rose during the 1970s to reach over two-thirds in 1979. Within the broad category of "Private creditors" other structural shifts were occurring: overall, its share declined, but one of the subclasses, suppliers' credit, recorded a marked (though not steady) increase, rising from 4 per cent in 1967 of total borrowing to 16 per cent in 1978. Conversely borrowing from the financial institutions (banks, etc.) fell very sharply; the proportionate share of this category fell from about one half of total borrowing in the late 1960s to one fifth in 1979. This declining share of the financial institutions may also be interpreted as a growth rate of new commitments lower than that of other creditors, and this may be another reason for the poor disbursement and net transfer record noted in

Table 9.10 Structure of debt outstanding by type of creditor:
Zambia, 1967-79

(Expressed as a percentage of total debt outstanding at year end)

	Official creditors			Private creditors			
	Total	Govern- ments	Interna- tional Organiza- tions	Total	Govern- ments suppliers' credit	Interna- tional Organiza- tions Financial insitutions	Other (b)
1967	50.6	24.0	26.6	49.4	4.4	45.0	--
1968	46.5	21.2	25.4	53.5	8.1	45.4	--
1969	42.3	18.4	23.9	57.6	6.7	50.9	--
1970	22.5	11.5	11.0	77.5	4.2	20.8	52.4
1971	28.6	16.6	12.0	71.5	3.7	18.1	49.6
1972	28.8	17.4	11.4	71.2	10.7	23.0	37.4
1973	43.1	28.9	14.2	56.9	10.6	46.3	--
1974	56.6	38.6	18.1	43.4	8.4	35.0	--
1975	51.9	34.1	17.8	48.1	9.5	38.7	--
1976	56.8	35.6	21.3	43.2	9.1	34.1	--
1977	57.1	34.9	22.3	42.9	14.8	28.1	--
1978	62.8	38.5	24.3	37.2	15.5	21.7	--
1979	69.0	45.9	23.1	31.0	11.7	19.3	--

Source: Calculated from World Bank World Debt Tables (October 1976, November 1979 and October 1980 issues).

(a) There may be slight discrepancies due to inconsistency of data in successive issues of the World Debt Tables.

(b) Includes bond flotation.

the discussion of Table 9.8. It is also suggested that the decline in the share of the financial institutions reflects their concern at Zambia's deteriorating creditworthiness (there was a sharp decline in 1977 and after, at which stage it would have become clear that Zambia's economic problems were rather more serious than the normal cyclical movements due to unstable copper prices). Moreover, it is possible that the institutions may have lost confidence in the ability of Zambian enterprises to service and repay foreign debt as the government's programme of nationalisation continued in the 1960s and early 1970s. These hypotheses are stated without substantiation, but they reflect some of the problems which developing countries have to overcome in attempting to raise sufficient external capital inflows to finance development plans or to cover current account deficits.

In the discussion of this section it has been suggested that if Zambia had a "debt problem" then it was that its indebtedness increased too slowly rather than too fast, and that any potential debt servicing difficulties arose from the deterioration of the terms of trade rather than from the development of a debt structure which was excessively costly. This statement should be qualified by noting that Appendix S Table S.9.1 shows that interest payments rose comparatively slowly, while amortization increased substantially in the late 1970s. This feature is due to the "bunching" of repayments of several medium-term loans contracted from international banks, particularly those raised to finance the repurchase of the ZIMCO bonds. Although the pattern and structure of Zambia's

debt may show some variation from the norm this does not deny that it may have a debt servicing problem.

The essence of the problem is that Zambia encountered foreign currency liquidity difficulties which meant that a modest accumulation of debt became a heavy servicing burden. Duff and Peacock (1977) have suggested an alternative "cash flow" indicator of indebtedness to determine whether a country is likely to experience debt servicing problems in the near future; it is defined as

$$\frac{R + A + LC + T}{DS}$$

where R is the monetary authorities' foreign exchange reserves
A is the commercial banks' net foreign currency assets
LC is the value of loans committed but undisbursed
T is the forecast balance of trade and "invisibles"
DS is the total debt service.

The intention of this indicator is accepted in the sense that it provides an indication of a country's actual or expected liquid foreign currency resources relative to the demands imposed by annual debt service. However it is felt to be adequate only for short-term analysis of indebtedness since it is unlikely to reveal underlying structural imbalances which are not revealed by other indicators. Moreover it has an inherent tendency to overestimate the liquidity available because committed and undisbursed loans (LC) cannot realistically be expected to be drawn down in one year, particularly if a significant proportion of the undisbursed loans are project related, and a similar reservation could be stated for foreign currency reserves.

In the next section a comparison is made among a number of countries which sought multilateral debt renegotiations during the period 1975-80 to determine whether Zambia shows any similarity to these cases. The analysis is based upon the more conventional indicators outlined in Appendix IX.1.

9.5 An assessment of the risk of renegotiation

This section examines the experience of ten countries which sought multilateral debt renegotiations through the "Paris Club" during the period 1975-80 and for which adequate data are available. Their experience is compared with certain averages for the less developed countries taken as a whole (29) and a comparison is made between the indicators for this group of countries and those for Zambia. The information on which the discussion is based is contained in Tables 9.11, 9.12, and 9.13. It is clear from an examination of the individual countries which have been forced to recognize formally that they were temporarily unable to meet their contractual obligations (or faced the prospect of so doing) that no uniformity emerges from the range of indicators used to make the comparison.

Table 9.11 shows that renegotiating countries have a much higher debt "burden" than the average, whether this is measured in terms of the cost of debt servicing relative to exports or by the ratio of disbursed debt outstanding to exports. Without exception the ratio $\frac{DOD}{X}$ was higher than the average for all developing countries (in several cases by a large factor) and the table also suggests that in most cases the ratio decreased markedly in or immediately before the year of renegotiation (30). Similarly the debt service

Table 9.11 Comparative debt and debt service ratio

(Percentages)

	Year of renego- tiation	Debt service ratio(a)		Debt/export ratio(b)	
		In year of renego- tiation	Average (c)	In year of renego- tiation	Average (c)
All LDCs	n.a.	n.a.	9	n.a.	69
Chile	1975	29	11	213	205
India	1975	13	20	216	312
	1976	11	17	199	266
Zaire	1976	8	12	197	109
	1977	11	11	220	148
Sierra Leone	1977	10	12	118	98
Turkey	1978	14	13	206	149
	1979	20	13	337	166
Gabon	1978	21	7	86	77
Peru	1978	31	27	223	201
Togo	1979	32	12	276	137
Sudan	1979	33	10	252	234
Liberia	1980	14	5	82	54
Average (d)		20	13	187	158
Zambia	n.a.	n.a.	12	n.a.	111

Sources: Calculated from data obtained as follows:

(a) Debt service and debt outstanding: World Bank World Debt Tables, Vols. I and II, 1980 (Tables 4, 6, 7, and 8).(b) Exports: International Monetary Fund Balance of Payments Yearbook, Vol. 2 (Tables (-1) and (-2)).

n.a. = not applicable

(a) Debt service ratio = debt service divided by exports of goods and services.

(b) Ratio of disbursed debt outstanding to exports.

(c) For all LDCs and Zambia calculated for 1974-79. For other countries calculated for three years prior to renegotiation.

(d) Unweighted average of renegotiation cases; where there is more than one case per country only the first is used.

ratio for most renegotiating countries (but not all) was significantly higher than the average, and again there are several instances of very sharp rise indeed during the year negotiations commenced, particularly Chile, Gabon, Togo, Sudan and Liberia. However in a number of countries the debt service ratio actually declined; in the case of India this decline was large and consistent in the years immediately before renegotiation. This somewhat aberrant behaviour on the part of India is noted with respect to several of the indicators used in the tables, and the profile which emerges from this analysis does not provide any convincing explanation for India's renegotiation. For this reason no further consideration is made of India, which must be regarded as a special case. There was a pronounced tendency in countries seeking renegotiation in 1978 and after for there to have been a sharp increase in the two ratios. This reflected a general rise among all developing countries, but the rise in each of the critical countries was more rapid than the norm. This pattern appeared particularly in Zaire, Turkey, Togo and Sudan. Although a number of the countries experienced debt service ratios which exceeded the 20 per cent level, there were only four which were more than 22 per cent, and several were substantially below this "danger level".

The heterogeneity of performance among the renegotiating countries appears even more starkly in Table 9.12 where the trend growth rates of disbursed debt outstanding show that the average growth rates of debt outstanding for the 10 countries (23 per cent) was the same as that for the developing countries as a whole. This

Table 9.12 Comparative growth rates of outstanding debt
and international trade (a)

(Percentages)

	Year of renego- tiation	Debt outstand- ing and disbursed: Trend growth	Exports:		Imports:	
			Growth in year of renego- tiation	Trend growth	Growth in year of renego- tiation	Trend growth
All LDCs	n.a.	23	n.a.	14	n.a.	15
Chile	1975	15	-27	25	-10	20
India	1975	8	32	27	19	27
	1976	8	18	27	-4	15
Zaire	1976	35	11	-4	2	17
	1977	29	14	-6	49	12
Sierra Leone	1977	12	22	-2	13	-4
Turkey	1978	25	19	12	-22	2
	1979	45	7	6	13	-2
Gabon	1978	20	2	11	-22	3
Peru	1978	22	12	13	-15	-6
Togo	1979	54	-13	15	-19	37
Sudan	1979	10	4	5	19	6
Liberia	1980	29	11	10	5	6
Average (c)		23	7	11	-3	11
Zambia	n.a.	19	n.a.	6	n.a.	2

Sources: Calculated from data as in Table 9.11.

n.a. = not applicable

(a) All expressed in current prices.

(b) For all LDCs and Zambia calculated for 1974-79. For other countries cover three years preceding the year of renegotiation.

(c) Unweighted average of renegotiation cases: where there is more than one case per country only the first is used.

average conceals a very wide range of growth rates (8 per cent for India, 10 per cent for Sudan to 54 per cent for Togo), and clearly some countries developed servicing difficulties as a result of too rapid an accumulation of indebtedness, but this is not a universal feature. The performance of exports and imports may provide a further explanation for the debt problems of some countries, especially those whose debt grew only slowly. Chile suffered a severe reduction in its exports in 1975 (a result of the collapse of copper prices which afflicted Zambia in that same year) and although it managed to achieve a reduction in its import bill this was not adequate to compensate for the loss of exports. Zaire (another copper producer) was similarly affected by a decline in its export earnings, but its disbursed debt outstanding also expanded rapidly. Sudan and Sierra Leone are two other countries whose debt grew slowly but where export values fell or showed only a limited rise. The averages for the group as a whole suggest that exports followed a declining trend for these countries in the years leading up to renegotiation, that the growth rate fell in the year of renegotiation; it would also appear that the countries attempted to restrain imports - in only three countries was the trend growth rate of imports higher than that of exports. This suggests that some countries shared the Zambian experience of declining terms of trade.

The debt service and debt/exports ratios provide a measure of past reliance on external debt (see Appendix IX.1) while the growth of exports and imports gives a rough indication of the economy's capacity to service its debt based on this past reliance

together with an assessment of competing demands on scarce foreign exchange earnings and reserves. The ratios of disbursements and net transfers to imports ($\frac{DB}{M}$ and $\frac{NT}{M}$) are more ambiguous, although it is suggested in Appendix IX.1 that they measure current reliance on borrowing. The difficulty arises because of the secular decline in the terms of lending - if interest rates rise and amortization periods are reduced then the net transfer out of a given level of disbursements will decrease as time passes. Even the disbursement/imports ratio is not neutral to variations in the terms of lending for it can be argued that a country will vary its borrowing behaviour depending on the terms which it can get for a loan.

Having stated these qualifications two features of the re-negotiating countries emerging from Table 9.13 are noted: firstly that on average they display a greater current "reliance" on external borrowing relative to imports than the average for all developing countries; and secondly that there was a decline in the availability of foreign resources (as measured by the ratios of disbursement and net transfer) in the year of renegotiation when compared with the average for the three preceding years. This suggests another feature in common with Zambia introduced in section 9.4: that in addition to deteriorating terms of lending, creditors may have lost confidence as a country was observed to be experiencing economic difficulties and consequently became reluctant to extend new credit. In some cases the decline in the ratio of net transfers to imports ($\frac{NT}{M}$) was very sharp, notably Chile, Gabon, Peru and Togo, but again the experience is far from uniform.

Table 9.13 Comparative disbursement and net transfer ratios

(Percentages)

Country	Year of renegotiation	In year of renegotiation			Average (a)		
		Disburse- ments ÷ imports(b)	Net trans- fer ÷ imports (c)	Net trans- fer ÷ disburse- ments(d)	Disburse- ments ÷ imports (b)	Net trans- fer ÷ imports (c)	Net trans- fer ÷ disburse- ments(d)
All LDCs	n.a.	n.a.	n.a.	n.a.	20	10	50
Chile	1975	12	-9	-77	19	10	54
India	1975	28	16	58	26	9	36
	1976	25	12	50	26	12	46
Zaire	1976	30	25	84	31	25	76
	1977	22	18	81	29	22	73
Sierra Leone	1977	14	7	48	15	7	48
Turkey	1978	15	7	48	9	3	36
	1979	68	58	85	12	5	48
Gabon	1978	12	-15	-122	26	18	68
Peru	1978	32	4	11	35	18	53
Togo	1979	25	10	40	30	24	85
Sudan	1979	25	35	28	9	36	47
Liberia	1980	29	16	56	13	8	61
Average (e)		22	10	17	24	16	56
Zambia	n.a.	n.a.	n.a.	n.a.	16	6	24

Source: Calculated from data as in Table 9.11.

n.a. = not applicable

(a) For "All LDCs" and Zambia calculated for 1974-79. For other countries covers three years preceding the year of renegotiation.

(b) $\frac{DB}{M}$.(c) $\frac{NT}{M}$.(d) $\frac{NT}{DB}$.

(e) Unweighted average of renegotiation cases: where there is more than one case per country only the first is used.

The final ratio which is discussed is what may be regarded as a "roll-over condition": the ratio of net transfers to disbursements $\frac{NT}{DB}$. A low value of this ratio shows that a country can apply only a small proportion of new borrowing to finance its current account deficit, since it must apply most inflows to the servicing of past commitments. In most cases there was a very sharp fall in this ratio between the average for the three preceding years and the year of renegotiation itself. Unless a country has reached the advanced stage in the debt cycle where it is able to commence the decumulation of debt outstanding then a fall in $\frac{NT}{DB}$ must be regarded with some concern: a relative decline in net transfers means that current account deficits must be financed by other means (decumulation of reserves, higher export earnings, lower imports, etc.) most of which would have a contractionary influence on the domestic economy.

The picture emerging from this brief analysis is far from conclusive, and it is simply not possible to state that a given series of ratios form necessary and sufficient conditions for an economy to face a debt servicing problem. Nor is it possible to conclude that if a country does not experience particular values of the relevant indicators then it will not have any difficulty in meeting its contractual obligations. Having stated these reservations it is possible to make various assertions about Zambia's external indebtedness.

Zambia's debt service ratio (Table 9.11) for the period 1974-79 was slightly lower than that for the average of the ten

renegotiating countries in the three years preceding their rescheduling but was considerably higher than the average for all developing countries. However like many of the renegotiating countries Zambia's debt service ratio rose quite steeply during the latter part of the 1970s; an almost universal feature of the countries which encountered difficulties was that debt service ratios rose shortly before renegotiation commenced. Similarly Zambia's ratio of disbursed debt outstanding to exports (Table 9.11) was considerably higher than the average for all developing countries but was lower than the average for the renegotiating countries. Appendix S. Table S.9.2 shows that the ratio rose fairly rapidly between 1974 and 1978 (a feature which would be expected in an economy running into debt problems) but the reduction in the rate of growth of indebtedness and a temporary increase in export earnings in 1979 combined to cause a reduction in the debt/export ratio. Although Zambia's total indebtedness rose more slowly than the average for both the developing countries as a whole and the renegotiating countries (Table 9.12) it should be noted that the debt of four of the latter group grew more slowly than Zambia's. Moreover Table 9.12 also suggests that Zambia shared with a number of the renegotiating countries a very low rate of increase in the value of exports (measured in current prices) and a similar low expansion of imports. Foreign exchange constraints caused by deteriorating terms of trade clearly caused problems for a number of countries: on this criterion Zambia must be included among those countries at risk of encountering servicing problems.

If the indicators of past reliance on external indebtedness indicate that Zambia was a country at risk, then the indicators of current reliance indicate this even more clearly (Table 9.13). Inspection of the ratios $\frac{DB}{M}$ and $\frac{NT}{M}$ in Appendix S Table S.9.2 show a very marked decline in the case of Zambia during the late 1970s, and this, combined with the low growth rates of exports and imports, must class Zambia among the more vulnerable countries. The reservations about treating these two ratios as indicators of current reliance discussed above are recalled, and it is perhaps more correct to regard these as measures of the current availability of foreign loans to finance current account deficits; Zambia's access to new credit, like many renegotiating countries, was reduced at a time when increased flows were needed. This point is emphasized by the measure of "roll-over conditions", $\frac{NT}{DB}$, which in Zambia was very substantially lower than any of the renegotiating countries and also was less than half the value of the average for the developing countries as a whole. Moreover the ratio declined sharply after 1974 (see Appendix S Table S.9.2); indeed in 1978 it registered a value of -79 per cent, that is there was a large net outflow during that year, and in 1980 it was only 2 per cent. This ratio more than any other must indicate that, unless Zambia increases the amount it borrows or improves its disbursement record, then there is a very real chance that it may be forced into some form of rescheduling arrangement or even formal multilateral renegotiation.

One other feature of the problem of indebtedness which proved to be incapable of comparative documentation is the question

of the accumulation of arrears on external payments. At the time of writing no formal data exist which allow a consistent and comprehensive comparison among countries. However, the IMF (May 1981, page 18) notes that by the end of 1979 arrears had risen sevenfold from their level at the end of 1975, that these arrears were equivalent to about 40 per cent of the value of the merchandise exports of the countries concerned, and that in some countries this proportion was as high as 100 per cent. Finally it noted that all the countries which rescheduled their debt had accumulated arrears in the immediately preceding period, with the exception of Chile (where apparently the crisis arose very rapidly) and India (which as noted above is exceptional in a large number of respects among the renegotiating countries). With these facts in mind it is apparent that Zambia was among the worst performers with respect to arrears, which, in 1978, rose to 75 per cent of merchandise exports and 102 per cent of imports (31). These arrears may be regarded as a form of involuntary credit, or as an informal means for rescheduling payments to foreign creditors. They do not enter most formal analyses of indebtedness, but the fact that Zambia made such extensive use of arrears, must be one reason - and a most important one - why it did not have to undertake a formal renegotiation, when so many of the indicators suggest that it was among the countries most at risk.

9.6 Debt accumulation and debt management policy in Zambia

This section attempts to examine the extent to which the accumulation of Zambia's external indebtedness has been guided by

any consistent overall principles. Such policy objectives might include: the maximization of net inward transfers to cover the foreign resource gap; contracting only those loans which are for a specific development objective; minimising relative debt service costs; or accepting loans which meet a prescribed minimum standard with respect to the financial and other terms offered. It is first necessary to put into perspective the role of long-term borrowing in financing Zambia's financial resource gap.

9.6.1 The financial role of long-term external debt It has frequently been stated that foreign resource inflows (or the use of 'foreign savings') will, ex post, be equal to both the domestic resource gap (domestic savings less net investment) and the foreign resource gap (the balance on the current account of the balance of payments). Table 7.7 (chapter 7) provides an insight into the means by which this gap is financed, and a more systematic presentation is attempted in Table 9.14. The paucity of data sources renders such analyses particularly prone to inconsistency or inaccuracy, and therefore Table 9.14 should be regarded as giving no more than an indication of the orders of magnitude involved.

In spite of these qualifications a number of observations may be made. Firstly it is clear that the assumption implicit in the algebraic model presented in section 9.2, that the foreign resource gap is covered exclusively by long-term foreign borrowing is very far from accurate. In the case of Zambia it is found that direct foreign investment has provided a relatively steady source of

Table 9.14 Financing the foreign resource gap: Zambia, 1967-79

(Million kwacha)

	Resource	Direct foreign invest- ment (2)	Port- folio invest- ment(b) (3)	Other capital		Use of re- serves (d) (6)	Errors and omis- sions (7)	Net flows from long- term public loans (e) (8)
	gap (a) (1)			Long- term (4)	Short- term (c) (5)			
1967-71	-244	...	...	...	...	...	...	292
1972	148	21	-9	61	12	105	-42	46
1973	-93	21	1	-32	-33	8	-58	10
1974	-11	25	-4	28	52	-17	-95	64
1975	464	23	-4	210	203	45	-13	244
1976	89	25	-4	78	31	42	-83	123
1977	171	14	-1	3	204	30	-79	86
1978	194	...	-2	14	156	163	-137	-27
1979	137	...	-2	140	-254	69	-90	100

Sources: Column (1) Table 7.7.
Columns (2)-(7) International Monetary Fund, Balance of Payments Yearbook
1980 and 1981, Washington: International Monetary Fund.
Column (8) Appendix S Table S.9.1.

(a) Current account balance equals net domestic investment less savings.
Positive sign indicates a need for a resource inflow. Column 1 equals sum of columns
(2) to (7).

(b) Public bonds and corporate equities.

(c) Includes arrears on external payments.

(d) Positive flow indicates decumulation of reserves.

(e) Disbursement less amortization.

financing (expressed in current prices). A more significant (if more erratic) source of finance has been the decumulation of net international reserves, and similarly substantial use has been made of short-term capital movements which, particularly for the years 1974 to 1978, represented the largest single source. "Other capital: long term" includes (but does not entirely consist of) net flows related to the country's long-term external indebtedness as tabulated elsewhere in this chapter; indeed a comparison of columns (4) and (8) indicates the significance of other types of long-term capital movement (32), although it must be stressed that column (8) excludes debt which is not guaranteed by the government (33).

The second major feature of Table 9.14 is that net long-term foreign borrowing appears to be only weakly related to the resource gap: that is, in some years (for instance 1973 and 1974) there was no resource gap and yet net long-term borrowing continued, while in other years (e.g., 1978) a substantial resource gap coincided with a net decrease in long-term external indebtedness. Both cases reflect a lack of responsiveness of net flows to the rapidly changing financial climate of the Zambian economy (34). However, over the five-year period from 1967 to 1971 there was a sustained financial surplus and yet a substantial amount of external debt was contracted, thus, incidentally, providing a further explanation for the accumulation of net foreign reserves which occurred during the late 1960s. Jeker (1978, p. 109) has suggested that this borrowing was used to finance mining operations and expansion, and the construction of major infrastructural projects which required sophisticated

technology. On the latter point a rarely noted component of certain aid flows is the significant element of "free" (and invisible) technical assistance in the form of the project appraisal and supervision which is provided by officials of the donor institution. This is particularly true of loans from the World Bank, and Zambia used this source extensively in the early years of Independence, most notably in its investment in power generating capacity (35).

The role of foreign borrowing emerges rather more clearly from Table 9.15. Although the gross investment ratio was apparently satisfactory, the relatively high consumption of fixed capital (36) caused the net investment ratio to be very substantially lower. The domestic savings ratio was also impressively high for lower middle income developing economy (37) during the late 1960s and early 1970s, but thereafter it fell very steeply indeed. The net effect of a fairly steady investment ratio and rapidly declining savings ratio was the emergence of a large financial resource gap in the later years of the 1970s and consequently the need for a more rapid accumulation of external debt. The need for a net inward transfer may be assessed by the size of the ratio of the financial resource gap to gross domestic product, and the success of the economy in attracting such an inflow or transfer may be seen by either the net flow or net transfer ratios. The former measures the actual capital flow, while the latter includes the cost (of debt servicing) of attracting the foreign resource inflow. On the technical consideration that gross domestic product includes net property income (including financial capital) from abroad, the net transfer ratio is

Table 9.15 Savings, investment and debt ratios: 1972-79

(Expressed as a proportion of gross domestic product)

	1965-69	1970-74	1975-79
1. Gross investment (a)	23.5	29.3	27.9
2. Net investment (b)	15.5	16.7	13.1
3. Savings	28.0	18.6	6.6
4. Financial resource gap (c)	-13.5	-1.9	6.5
5. Net flow (d)	1.3	4.8	5.1
6. Net transfer (e)	0.8	2.9	3.2

Sources: Calculated from Appendix S Tables S.1.3, S.1.6, S.1.7 and S.9.1.

(a) Gross fixed capital formation (GFCF).

(b) GFCF less consumption of fixed capital.

(c) Net investment plus increase in stocks less savings (negative sign indicates surplus). Also equal (in principle) to current account balance.

(d) Disbursements less amortization.

(e) Disbursements less total debt service.

considered to be the more appropriate. By this measure the net transfer is seen to have been only about one half of the total amount which was needed - the remainder was financed by the various alternative means discussed for financing the balance of payments, including short-term borrowing and the accumulation of arrears on external payments. In the two previous periods there was a positive inward flow or transfer even though this was not needed to fill a financial resource gap (38).

9.6.2 The structure of public external long-term indebtedness. Only about one fifth of the public debt which was disbursed and outstanding at the end of 1979 had been raised for purposes which could be identified immediately as directly productive, that is, used in one of the three sectors agriculture, mining or manufacturing (see Table 9.16, column (3)). A proportion over twice as large was outstanding in respect of loans raised for projects concerned with the provision of economic infrastructure power generation, transportation and telecommunications. Only a relatively small proportion (4 per cent) had been raised for social infrastructural purposes (housing, education and health).

Abbott (1979, p. 131) has rightly pointed out that a country may experience debt problems if it has "invested heavily and indiscriminately in projects which have either not been costed, or proved uneconomical in the long run." He goes on to say that in some instances, "Expected returns have not materialised, and they have been left with expensive 'showpiece' projects which eat into

Table 9.16 Structure of public and public guaranteed debt by purpose of borrowing

(Percentages)

	Amounts disbursed and outstanding at end of 1979			Original amounts of government loans outstanding (1979)
	Direct Government	Government guaranteed (a)	Total	
	(1)	(2)	(3)	(4)
Agriculture, forestry and fishing	2.4	0.1	1.5	3.4
Mining and quarrying	—	15.0	5.8	0.7
Manufacturing	1.3	32.3	13.3	1.5
Power generation	2.2	35.8	15.2	3.0
Transportation: roads, railways, etc.	43.5	5.0	28.6	30.5
Telecommunications	1.3	2.4	1.7	0.9
Education	4.1	--	2.5	3.1
Health and sanitation	0.1	--	0.1	0.7
Housing	1.8	--	1.1	1.3
Development finance institutions	--	0.5	0.2	0.1
Non-project	27.6	8.9	20.3	22.1
Unspecified	15.8	--	9.7	32.7
Memorandum item:				
Value of outstanding debt (million kwacha)	766.2	486.4	1,252.6	1,473.0

Sources: Calculated from Republic of Zambia, Financial Report 1979, Lusaka: Government Printer, Appendices 1 and 5: pages 505-9 and 553-60.

(a) May include negligible amounts of interest due and not paid.

their limited foreign exchange resources without yielding any returns." The point at issue here is the rate of return or yield on a project: sometimes project appraisal is inadequate and investments are undertaken without a full evaluation of the financial and economic costs involved. Low or zero discount rates and shadow prices may be used to produce an evaluation which makes the project appear highly attractive, but unless the full foreign exchange outlay and income have been properly included it is quite possible to recommend a project which constitutes a large net foreign exchange drain on the economy. This is not to argue that a project should only be undertaken if it has a positive foreign currency yield, but policy makers should be aware that if they borrow from external sources for a project which does not have such a yield then they must ensure that alternative activities are undertaken to generate the necessary resources to service the debt incurred. For instance an investment in a housing project has almost no chance of generating additional foreign currency (or even of causing some import substitution); therefore if a country borrows from abroad for such projects it must be prepared to divert future export earnings towards servicing the resulting obligations.

There is also a problem of ex post appraisal, again well illustrated by infrastructural projects. It is virtually impossible to obtain data which would allow a complete economic analysis of the impact and actual yield of a project. These comments should also be qualified by noting that financial resources are fungible: thus investment financed by external loans in one project may well

release resources (in domestic currency) which might be used to generate additional foreign earnings. Equally the released funds might create an additional import demand. The problem may not be capable of analytic resolution - it is often impossible to isolate completely the costs and benefits of particular projects (39).

Of the different functions summarized in Table 9.16 the problems are well demonstrated by the various forms of economic infrastructure for which borrowing was undertaken by Zambia. Investment in roads and other forms of transportation is unlikely to yield any form of direct financial return, although it may indirectly increase markedly the productive capacity of the economy including its export earning ability, but the effects are not easy to quantify. Therefore borrowing for this purpose is undertaken almost exclusively directly by the government (44 per cent of government borrowing outstanding in 1979 was for transportation). Power generation, on the other hand, is capable of yielding high returns whether measured by strictly financial or socio-economic criteria, although its potential for generating foreign currency earnings is generally more limited (40). In summary it can be asserted without much doubt that Zambia's concentration on infrastructural projects contributed to the difficulty which it encountered in meeting its external payments.

Table 9.16 also shows that a significant proportion of Zambia's public and publicly guaranteed debt was raised for non-project purposes. It is believed that a substantial proportion of the "Unspecified" loans were also of a non-project variety. These loans,

also frequently called "programme" loans, are raised for balance of payments support. They differ from other loans in that they are not tied to the purchase of goods for a specified project (though they may be tied to purchases from the donor country). It is rare, however, to find that such loans do not stipulate a range of goods or purposes - indeed the only major source of finance completely untied in this sense is the range of facilities offered by the International Monetary Fund. One of the major problems with programme or non-project loans is that they are even more vulnerable to 'abuse' than project loans: there is no adequate method of applying the principles of project evaluation, or otherwise appraising their impact on the recipient economy, other than to attempt to estimate the growth effects of an improvement in the balance of payments. There is one particular class of programme loan - the compensatory financing scheme - which is particularly appropriate to primary producing countries. The objective of such loans is purely to stabilize the export earnings of the recipient country, with disbursements occurring when earnings fall below an estimated trend value and repayments falling due (in principle at least) when earnings rise above trend (41). It is not the object of this type of lending to achieve a net flow of resources to developing countries over the long-term, merely to achieve some stability of resource availability.

Non-project lending has two further advantages over more traditional forms of lending. Firstly, it is more appropriate to the economy-wide policy measures which must be taken to achieve

structural adjustment in the light of adverse external circumstance; that is it allows the benefits of the increased foreign exchange inflow to be spread over a wide range of uses rather than being concentrated on a small number of more favoured projects. Expressed alternatively it allows policy measures to be implemented across a larger number of sectors or areas in the economy rather than encouraging an "incremental" approach to development activity.

Secondly, non-project lending is capable of much faster disbursement since it is not linked to a particular implementation schedule; in many cases project loans may take between 5 and 10 years to be completely drawn down depending on the gestation period (42). Non-project loans can be particularly attractive to governments as well since they may provide budgetary support which can relieve the demands on the banking system for credit expansion (43). In 1978 the system did not function adequately in Zambia because the creation of credit for non-government sectors was so severely restricted that companies which had been identified as beneficiaries of the substantial amounts of non-project aid which was being offered, were unable to raise sufficient cash to reimburse the government for the foreign currency received. As the government could not extend credit (because of restrictions on its own borrowing) a vicious circle was established which prevented these non-project loans from being disbursed as quickly as might have been the case. This is believed to have been one of the reasons for the net outflow of loans which occurred in 1978 - gross inflow was very severely reduced because of the bottleneck created.

Another reason for the very low level of disbursements in 1978 relates to the method of disbursement of many project loans: in many cases recipients are required to incur expenditure on the project and are then reimbursed (often several months later) when the donor is presented with proof of purchase (44). In 1978, operating within the quarterly credit ceilings imposed under the 1978-80 IMF programme, the Ministry of Finance was unwilling to allow such expenditure in case the reimbursement was not received from the donor in time to maintain government credit within its permitted limits. Thus for a time disbursements were slowed significantly.

Finally returning to Table 9.16, attention is drawn to the variation in structure between columns (1) and (4). The former represents the amounts drawn down and outstanding, and the latter the original negotiated amounts of those loans which were still outstanding at the end of 1979. The variation would have two causes: different terms (maturity periods) for loans for different purposes, and variations in the rate of disbursement. With respect to the latter, the difference is particularly pronounced in the "unspecified" projects category, since significant numbers and proportions of loans remain undisbursed for long periods of time. Nevertheless there is little evidence that there was any secular change in the disbursed proportion of total debt outstanding (including that committed but undisbursed), as Table 9.17 suggests (45). This proportion could be increased by better disbursement procedures on the part of both Zambia and the donors, and also by incurring a higher volume of quick-disbursing non-project loans.

Table 9.17 Disbursed debt as a proportion of total indebtedness

Year	Percentages
1967	76.4
1968	66.8
1969	71.9
1970	64.4
1971	67.9
1972	68.9
1973	58.6
1974	54.9
1975	65.7
1976	66.8
1977	75.2
1978	66.1
1979	66.1

Source: Calculated from Appendix S, Table S.9.1.

9.6.3 Zambian debt policy A search of Zambian official publications of policy pronouncements reveals almost no evidence of any attempt to formulate a rational set of principles to guide the accumulation of external indebtedness in Zambia. The few references which can be found tend to confirm the picture which emerged from the analysis of the preceding sub-sections. Most of these references appear in the three national development plans which have been published since 1965. It is worth quoting at length from each of these plans since the chosen extracts represent almost a complete documentation of the policy statements on external debt management.

The First National Development Plan (FNDP) was concerned to finance infrastructural development from external sources.

"A small number of projects in the Development Plan concern long-term infrastructure which will lay the foundation for future development probably over many decades. Among such projects are the Kafue Hydro-electric scheme, the University of Zambia, the major roads, the Tan-Zam railway. It is logical that investment in such projects should be spread well beyond the period of the present Development Plan. It is, therefore, intended to seek external finance for some major development projects." (Republic of Zambia (1966, p. 15)).

The Second National Development Plan (SNDP) envisaged a similar purpose for borrowing, but was also aware of the growing risk of foreign exchange constraints. It was sanguine about the current debt service ratio, implying that it should be maintained at least at that level.

"Zambia is, in view of its development potentials (sic), capable of attracting, making use of and arranging for repayment of more foreign aid in the SNDP than in the past Plan period. It is recognised that during the SNDP the country will spend considerable foreign exchange resources for meeting repayment obligations emanating in particular from the taking over of the copper mining industry in 1969.

"It will be necessary to conclude fresh foreign loans during the SNDP period. A major part of these loans will continue to be channelled, as in the past, to infra-structural development.

"..... It is estimated that the debt service payments will absorb about 8 per cent of export revenues during the next five years. This must be considered a modest ratio for a developing country." (Republic of Zambia (1972, pp. 47-48)).

By the time the Third National Development Plan (TNDP) was due to commence in 1979, Zambia had, as shown earlier in this chapter, accumulated a very substantial debt burden, and simultaneously had developed a much larger foreign resource gap. In spite of this the TNDP document adopted an almost nonchalant attitude toward the question of external financing and indebtedness; it slipped in a reference to the possibility of debt rescheduling which had not been openly discussed anywhere else in government circles.

"..... the capital inflow will have to be tailored to the country's priorities and needs, that is to say, this will have to include not only project loans but also programme loans and debt re-scheduling. Assistance on concessional terms will be another consideration." (Republic of Zambia (1979, p. 45)).

If rescheduling were indeed seriously being considered it is extraordinary that this very brief statement constitutes the entire external debt policy of an otherwise voluminous plan, in which foreign financial resources were recognized as being highly constrained (46).

Policy measures to control the increase in indebtedness were very limited. In 1978 the government decided that any new external borrowing exceeding K500,000 should be subject to the approval of the Bank of Zambia and the Minister of Finance (47). In the previous year the government introduced a fee on loans which it guaranteed for non-government institutions (48); but this was not a measure intended to control external borrowing since it applied equally to external and internal guarantees and would not have discriminated against foreign borrowing.

The authorities' passive monetary policy (described in Chapter 8, section 8.7) had at least one direct influence on the level of external borrowing which may have been too low as suggested in section 7.4 above. Since domestic interest rates were allowed to lag considerably behind international rates (49), there was no incentive for internationally creditworthy Zambian institutions or enterprises to seek foreign loans at rates which might have been almost double those which they would be required to pay to Zambian banks. This was particularly true of the mining companies which (as noted in chapters 6 and 8) placed very heavy demands on the domestic banking system. The fact that the "stabilization" package of policies, adopted by the government in the context of the 1978-80 IMF programme, gave such high priority to restoring the profitability of the mining industry (50), suggests that the government was concerned that the mining companies should regain their international creditworthiness, thus reducing their demands on the domestic banking system.

Another reason that resort to external borrowing may have been rather lower than the average for other countries in a similar position is that domestic resources were so severely restrained. This may appear rather paradoxical but may be illustrated by the case of the largest single external borrower - the government. The explanation also relates to the common policy among donor countries and institutions of financing only the foreign currency costs of projects. Thus if domestic resources are limited, as the government's capital budget certainly was after 1975, this will place a constraint on the amount which can be borrowed from abroad. This was undoubtedly one of the reasons for the low rates of disbursement of some loans during the late 1970s, but may also account for the government's reluctance to seek a higher level of new commitments. The solution is for donors to agree to finance domestic costs as well as those incurred in foreign currency. There is an increased risk of this type of borrowing becoming an even greater burden on the balance of payments than more traditional loans, unless the project generates additional foreign exchange earnings. For this reason it is suggested that domestic cost financing should be restricted to grants and concessional aid flows.

Although the Zambian authorities appear to have almost no firm stated policy on long-term external indebtedness this cannot be said to have applied to the very closely associated issue of the arrears on external payments. Indeed it was suggested previously that the accumulation of arrears was a direct alternative to, or substitute for, default on contractual debt payments. The Zambian

authorities clearly took the decision that it would be preferable to avoid default or rescheduling, both of which were perceived as carrying considerable international stigma and the greater risk of poorer credit ratings. While this may be true it was also the case that very large accumulations of arrears must ultimately directly affect a country's credit rating and the willingness of suppliers to continue to extend trade credits to Zambian firms. There is no published data which allow the analysis of the financial cost of arrears, but there can be little doubt that the penal interest rates charged for overdue suppliers' credits must be higher than the terms of formally negotiated international loan agreements. However certain categories of arrears did not carry any interest at all - for instance personal remittances by foreign contract employees could be delayed by 12 or 18 months. Thus the net financial cost of arrears accumulation would depend on the balance between those payments which carried penal interest and those which did not. Nevertheless, as noted in section 9.5, the accumulation of arrears preceded the process of rescheduling of external debts in most renegotiating countries in the period 1975-80.

Unless Zambia can succeed in reducing these arrears, possibly by the use of funds under the 1981 IMF agreement or its successor, it seems likely that it will eventually have to resort to some form of rescheduling. This could take the form either of a consolidation of arrears into a loan from the international capital markets or foreign aid donors, or a formal renegotiation of its debt

structure with its creditors. Since its debt structure is not unduly unbalanced in the sense of "bunching" in the early 1980s (51), the only form of debt relief which could help Zambia permanently is a moratorium on principal payments (and possibly interest as well) or an outright cancellation. This latter option would be well justified in Zambia's case since many loans were negotiated at a time when the country was in a much stronger economic position (52). Given the reluctance of the international community to consider generalised debt relief (53), and Zambia's reluctance to seek bilateral relief, it would seem that some form of consolidation of the arrears is a solution which should be actively pursued.

9.7 The International Monetary Fund as a major creditor

In this section various technical terms relating to IMF facilities and functions are used; a glossary describing these appears at Appendix IX.4.

Member countries' use of the resources of the International Monetary Fund (IMF) is regarded in standard balance of payments presentations as a reserve-related transaction. For this reason drawings under IMF facilities are separated from other short-term or long-term capital account transactions (that is they are not treated as loans) (54), and in presentations of external indebtedness countries' liabilities to the IMF are excluded altogether (55). This procedure may be understood in the context of the original intention of the normal credit tranches of the Fund, which were intended to be available for short-term stabilization of member countries' balance

of payments. In recent years the role of the IMF has changed significantly so that the greater part of facilities is now granted to the developing countries. Even more significantly the Fund has introduced or made more extensive use of facilities which are more concerned with longer-term structural adjustment in the economy (56). For these reasons the treatment of IMF resources as being separate and distinct from other forms of external indebtedness seems increasingly anachronistic. Moreover the increasing use by many countries of IMF resources imposes a significant servicing burden on their balance of payments in exactly the same way as contracting conventional forms of indebtedness. Finally the introduction of more long-term facilities (and the effective rolling over which occurs when IMF stand-by facilities are negotiated in successive years) means that countries' indebtedness to the IMF has grown in much the same way as their obligations to other creditors. Thus it is suggested that analyses of external indebtedness are incomplete without specifically including the IMF's credit and consequent servicing costs.

Tables 9.18 and 9.19 indicate the extent to which these observations are relevant in the case of Zambia. Until 1978 Zambia had made only very limited use of IMF credit, most of which had been under the Fund's Compensatory Financing Facility (CFF) to help in reducing the instability of its export earnings. In 1978, a two-year "stand-by" arrangement was negotiated with the Fund for a total package worth over 350 million special drawing rights (SDRs) the

Table 9.18 Balance of IMF drawings outstanding
relative to total debt, 1971-86
(actual and projections)

	Million kwacha			IMF drawings outstanding as a percentage of total debt (4)
	IMF facilities (IMF)(a) (1)	Debt outstanding and disbursed (DOD) (2)	DOD plus IMF (3)	
1971	15	421	436	3.6
1972	29	454	483	6.4
1973	44	420	464	10.5
1974	45	490	545	9.2
1975	57	708	765	8.1
1976	88	985	1,073	8.9
1977	88	1,067	1,155	7.3
1978	250	1,144	1,394	21.9
1979	326	1,246	1,572	26.2
1980	311	1,320	1,631	23.6
1981	643	1,290 (b)	1,933 (b)	49.8
Projections (c)				
1982	841	1,274	2,115	66.0
1983	1,015	1,237	2,252	82.0
1984	839	1,195	2,034	70.2
1985	662	1,142	1,804	58.0
1986	484	1,089	1,573	44.4

Sources: Calculated and estimated from
Appendix S Table S.6.3 (IMF drawings)
Appendix S Table S.6.4 (exchange rates)
Appendix S Table S.9.1 (other debt)
Details on IMF facilities - IMF, International Financial
Statistics, March 1982, pp. 5-6.

(a) Balance outstanding at end of period: normal credit tranches, compensatory financing, extended fund and oil facilities, but excluding Trust Fund.

(b) Estimate.

(c) Projections prepared on assumptions as follows:

(1) IMF: New drawings from 1981 programme spread equally over three years. Repayments assumed over maximum period allowed: credit tranche (5 years), oil facility (7 years), compensatory financing (5 years), extended fund facility (10 years), Enlarged Access Policy (7 years).

(2) DOD - based on World Bank projections (see Appendix S Table S.9.1) plus estimates of disbursements of loans committed but undisbursed at end of 1979 (each year 25 per cent of undisbursed balance is drawn down). No repayments.

Table 9.19 Estimated levels of IMF service charges (a) and repurchases (b) relative to total debt service, 1975-86

	Repur- chases (a) (1)	Charges (b) (2)	Million kwacha			IMF total as percentage of other total service (7) = (3)/(6)	
			Total (3)	Other debt service			
				Amorti- zation (4)	Interest (5)		Total (6)
1975	29	3 (c)	32 (c)	25	25	50	64
1976	18	4	22	36	39	78	28
1977	18	5	23	91	43	137	17
1978	--	9	9	111	36	150	6
1979	27	12	39	67	58	112	35
1980	45 (c)	16 (c)	61 (c)	183	58	252	24
1981	48 (c)	15 (c)	63 (c)	152 (c)	69 (c)	221 (c)	29
Projections (d)							
1982	67	39	106	128	65	193	55
1983	67	51	118	109	59	168	70
1984	178	62	240	106	52	158	152
1985	178	51	229	95	45	140	164
1986	112	40	152	93	39	132	115

Sources: Calculated and estimated from
Appendix S Table S.6.3 (IMF drawings and balances)
Appendix S Table S.6.4 (exchange rates)
Appendix S Table S.9.1 (other debt)

(a) "Repurchases" are equivalent to amortization payments.

(b) "Service charges" may be regarded as interest payments.

(c) Estimated values.

(d) Projections based on same assumptions as footnote (c) to Table 9.17 and the following:

(1) IMF charges calculated as 6.25% of balance outstanding at end of previous year. The rate is the generally applicable rate applied from 1981 following IMF Executive Board Decision No. 6834-81/65 - see IMF Annual Report 1981 Appendix II.

(2) Other interest charges based on average rate of 5.5 per cent, approximately the average available on new commitments at end of 1978 - see Table 9.9.

major part of which consisted of drawing from the higher credit tranches (57). This financial package was approximately the maximum possible by Zambia's quota, without using the even more onerous Extended Fund Facility. However three years later, in 1981, Zambia resorted to use of the EFF, as it became clear that the longer term objectives associated with this facility (a structural adjustment policy programme, disbursement over three years, and repayment over a period of up to 10 years) might be more compatible with the major structural changes which Zambia would have to make in the light of the permanence of the decline in the terms of trade which occurred in the 1970s. Under this second large IMF financial package, Zambia could expect to receive up to SDR 800 million (about K820 million) to be disbursed over three years (58). The policy measures associated with these programmes are discussed in Chapter 11 (59). By comparison with most flows of official development assistance these facilities are not concessional; an estimate showed that the grant element (60) of a loan under the EFF (at an interest rate of 6.5 per cent and with maturity between 4 and 10 years) ranges between 7.3 and 13.5 per cent, compared to the average of 39 per cent of official creditors to Zambia in 1978 (see Table 9.9).

Table 9.18 shows the effect of including outstanding IMF drawings in the total of outstanding disbursed debt. Until 1978 IMF drawings were very small relative to total other indebtedness, but the projections show that by 1983 they will have risen to an amount

equal to about three quarters of the value of other debt outstanding. It should again be stressed that the projections are all based upon amounts committed by the IMF and all other sources at the end of 1980 (beginning of 1981 in the case of the IMF) and do not take any account of new commitments which would be expected to raise the total balance outstanding in column (2) quite substantially. Similarly no account is taken of any possible extension of the repayment period by the Fund.

Reference to Table 9.18 suggests that after 1983 total service payments in respect of IMF facilities will actually exceed - quite substantially - payments to all other creditors. Even with the reservation that new commitments have been excluded, it is very clear that the IMF "debt" may become a major problem over the next few years. The main part of the service obligation relates to principal (repurchase obligations) rather than to interest, and the figures of Tables 9.18 and 9.19 indicate that between 1981 the net flow of resources from the IMF to Zambia will be negative to the extent of K159 million, while the net transfer (which also accounts for interest) will be -K402 million (61). Only if a very remarkable improvement in its external payments position occurs - which realistically could only result from a rapid rise in real copper prices - can Zambia face this prospect with equanimity.

Two broad conclusions are drawn. Firstly Zambia faces a much more serious debt servicing problem than most formal analyses

suggest and the very fact that it has resorted to IMF financing may eventually force it to seek some form of renegotiation. Secondly there are implications for the long-term role of the IMF which fall outside the coverage of this volume. The Fund may find that as time progresses it comes to be cast more in the role of a major creditor similar to the international banks and capital markets, thus competing with them to overcome the threat of default, rescheduling and other debt management problems, rather than in its traditional role of maintaining a liberal trading regime and attempting to maintain economic stability among its members. At least one solution presents itself - the IMF must be empowered by its member governments to grant loans which have a very much longer repayment period than has been the case in the past. This would also carry the obligation to become more concerned with the longer term issues of economic development and structural adjustment rather than a preoccupation with short-term economic stabilisation. There are some signs that such a shift has begun - the programme in Zambia under the Extended Fund Facility and the Enlarged Access Policy are evidence of this. It is also clear that this shift has been insufficient if it means that within three years of a programme the member country is experiencing debt servicing problems.

9.8 Conclusion

This chapter has shown that Zambia has not accumulated debt any more rapidly than other lower middle income countries, nor have

its absolute debt service obligations risen abnormally. However a comparison among Zambia and a number of countries which were forced to seek multilateral debt renegotiation during the period 1975-80 shows that Zambia must be regarded as a high risk country. This is not because of an irresponsible accumulation of indebtedness, but, as with so many of its other economic problems, results from the decline in its terms of trade, which has caused key indicators (such as the debt service ratio, and the ratio of debt outstanding and disbursed to exports) to rise to unsatisfactory levels. Similarly a poor disbursement record resulted in a dangerous fall in the ratios of net flows and net transfers to imports; that is, at a time when additional inflows were needed to compensate for declining terms of trade, the precise opposite was happening. It was noted that the Zambian authorities have not adopted any form of active debt management policy, except that of attempting to finance an ambitious programme of infrastructural development by external borrowing. Finally, although the country may not appear to have a particularly serious debt problem when measured by conventional indicators of long-term external debt, it was found that its substantial use of IMF resources and the accumulated arrears on external payments represent a very heavy additional burden on its severely constrained foreign resources.

Notes

1. See Dhonte (1979, page 58).
2. For discussion of the classification and individual indicators refer to Appendix IX.1.
3. For instance see Husain (in Avramovic, 1964, pp. 188-192), Dhonte (1979, pp. 95-97), Feder (1980), Ohlin (1966, pp. 43-55) and IMF (May 1981, p. 50). The original article by Chenery and Strout (1979) also contains elements of the model developed here.
4. It was established in Chapter 7 (section 7.6) that there was a much stronger correlation between imports and exports than between imports and output.
5. The solution is fully specified in Appendix IX.2. It is assumed that debt in the initial time period, i.e., D_0 is zero.
6. Achieved by dividing both sides of 9.10 by Y_t to give

$$\begin{aligned}\frac{D_t}{Y_t} &= \frac{kg - s}{g - i} \left(1 - \frac{Y_0 e^{it}}{Y_t} \right) \\ &= \frac{kg - s}{g - i} \left(1 - \frac{Y_0 e^{it}}{Y_0 e^{gt}} \right) \\ &= \frac{kg - s}{g - i} \left(1 - e^{(i-g)t} \right).\end{aligned}$$

7. The rate of change of the ratio $\frac{D_t}{Y_t}$ given in footnote (6) is

$$\frac{d}{dt} \left(\frac{D}{Y} \right) = (kg - s) e^{(i-g)t}$$

8. Achieved by dividing both sides of (9.14) by X_t to give, by a process similar to footnote (6),

$$\frac{D_t}{X_t} = \frac{a}{bx - i} \left(X_t^{b-1} - X_0^b e^{(i-x)t} \right) - \frac{1}{x - i} \left(1 - e^{(i-x)t} \right)$$

9. Since $M = a X^b$, $\frac{M}{X} = a X^{b-1}$.
10. Some of these studies were discussed briefly in Chapter 1, section 1.7.
11. Evidence of this was provided in Chapter 5, section 5.5.

12. The effect is produced by the fact that only a small number of the 17 countries of the group have in fact acquired the status of capital surplus nations. Many countries (e.g., Nigeria, Indonesia, Venezuela) used their new found oil wealth as collateral for financing massive development programmes.
13. This issue has been taken up by Abbott (1979, Chapter 6) who has analysed certain issues and made proposals with specific reference to the least developed countries.
14. For instance, see Abbott (1979, Chapter 5) who proposes a moratorium on repayments with selective cancellation for some countries.
15. The one exception to these comments is India, which (as may be seen by comparing the second and third rows of Table 9.4) recorded a substantial decline in all the ratios.
16. Ratio of external trade (exports or imports) to GDP or GNP.
17. See Appendix IX.1 for definition. The grant element provides a useful indicator of "average" terms combining both maturity (and grace) periods and interest rates.
18. The period between the commencement of disbursement and the start of principal payments.
19. With the annuity system payments are arranged so that total annual payments (interest plus amortization) are equal throughout the amortization period. In the case of equal principal payments, as the name implies amortization is spread evenly over the life of the loan. The cost to the borrower is higher in the latter case (in terms of discounted cash flow), although the undiscounted cash flow may actually be less; the "profile" of repayments becomes an inverted U-shape skewed to the left (near dates).
20. See Chapter 6, section 6.1 for details of the ZIMCO bond issue.
21. See Chapter 7, section 7.3.
22. During the period 1973-79 the debt service ratios of the following countries which did not seek formal renegotiation are noted: Egypt (average 23.6 per cent), Uruguay (29.9 per cent), Mexico (36.9 per cent), Brazil (20.9 per cent), Argentina (18.9 per cent), Mauritania (20.7 per cent), Guinea (19.7 per cent). Mexico's debt service ratios in the three most recent years of data availability were: 1977 - 43.4, 1978 - 53.4, 1979 - 64.1.
23. The Paris Club is not a formal financial institution, but a convention or means of bringing together a debtor country and its creditors (usually the governments of OECD countries) to arrange

debt rescheduling. There are no fixed procedures but the French Treasury usually organizes the meetings. See The Economist 20 March 1982 ("A Nightmare of Debt" p. 27).

24. Defined in Appendix IX.3.
25. At times gross foreign reserves were less than 2 months' imports. Indeed for most of 1977 and 1978 gross reserves were less than 1 month's current account payments (including invisibles). See Appendix S, Table S.6.2 for further data on reserves.
26. That is, as more debt is accumulated but at a diminishing rate, the level of amortization will rise relative to debt outstanding.
27. It should be noted that $\frac{NT}{DB}$ showed very large fluctuation from year to year: in the period 1976-80 it ranged from 50.9 per cent in 1976 to -78.6 per cent in 1978 (see Appendix S, Tables S.9.2)
28. These loans were raised from the Bank of America and Morgan Guarantee (see Government of Zambia, Financial Reports (issues between 1973 and 1980) for details of repayments).
29. 97 less developed countries, including major oil exporting countries, were used based on the analysis of the World Bank's World Debt Tables.
30. The one exception is India which behaves aberrantly in most cases in this study.
31. See Appendix S Tables S.6.1 and S.6.2 for raw data.
32. These would include currency, deposits and bills and bonds. See IMF (1977, page 146).
33. See Appendix IX.3 for further comments.
34. The former case was probably due to disbursements against loans contracted to pay for projects whose implementation would be spread over several years. In the latter case severe restrictions on the government's capital budget froze the local currency necessary to initiate spending against later reimbursement from donors.
35. The World Bank made large loans in the 1960s and 1970s for the construction of the Kariba and Kafue dams and associated generating installations.
36. See Bell 1981 (b) for a more detailed discussion of this point.

37. See Chapter 3 and World Bank (1981, Table 5, pp. 142-3) for comparative figures and discussion of the point.
38. An annual series of the net transfer and net flows appears in Appendix S Table S.9.1. Some interpretative use is then made in the ensuing Table S.9.2.
39. The issues of project appraisal in developing economies are described in the two standard (though not identical) methodological expositions of Little and Mirrlees (1974) and United Nations Industrial Development Organisation (1972).
40. Zambia is in the unusual, and fortunate, position of having an abundance of hydro-electric generation capacity and potential markets in Zaire and Zimbabwe for exports on the interconnected system.
41. Two examples are the IMF's Compensatory Financing Facility (CFF) described in the IMF's Annual Reports and the European Economic Community's Export Stabilization scheme (STABEX). Jeker (1977) has discussed the effects of the CFF on Zambia, and suggests that the amount available was inadequate to compensate for shortfalls in 1971 and 1975.
42. For instance by the end of 1979 the World Bank's first education loan to Zambia had not been fully disbursed, ten years after the loan was agreed. Repayment commenced in 1979. By contrast the 1976 World Bank Programme loan was drawn down within a year of signature. See Republic of Zambia, Financial Reports 1977 and 1979 (Appendix 5) for details.
43. The process is briefly as follows: the government as the borrower makes foreign exchange available to domestic purchasers who pay to the government the domestic currency equivalent, which then enters the budget as income.
44. This procedure is, for instance, the principal one used by the World Bank, see World Bank (1974).
45. Some loans remain unused for many years: a credit of US\$50 million from Romania had not been used at all by the end of 1979 (Republic of Zambia Financial Report 1979, Appendix 5). Despite protracted negotiations with the Romanian government, agreement could not be reached on the "package" of goods to be bought (the loan was tied to Romanian goods).
46. This renegotiation was rather limited, however, a point discussed at length in Bell (1981 b) where the TNDP is shown to have seriously underestimated the foreign resource gap expected in the period 1979-83.

47. See Republic of Zambia, Budget Address, January 1978 by J.M. Mwanakatwe (para. 106).
48. See Republic of Zambia, Budget Address, January 1977 by J.M. Mwanakatwe (para. 156-8). The fee was equal to 1.25 per cent of the total amount guaranteed.
49. See footnote 60 to Chapter 8.
50. See the statement made to the National Assembly by the Minister of Finance J.M. Mwanakatwe, reproduced in full in the Zambia Daily Mail of 18 March 1978 under the headline "Factors that led to the devaluation".
51. See Appendix S, Table S.9.1 for the World Bank's projections of debt service up to 1987 based on amounts outstanding at the end of 1979.
52. Some indirect indication of the international community's rating of Zambia's decreasing creditworthiness (or ability to service debt) is that the World Bank allowed Zambia access to its concessional lending arm, the International Development Association (IDA) for the first time in 1979 (see Republic of Zambia, Financial Report, 1979 Appendix 5).
53. Abbott (1979, Chapter 5) has a lengthy appraisal of the reluctance of creditor (and some debtor) nations to undertake generalized relief for all developing countries.
54. See IMF (1977 a, paras. 469-472, page 156).
55. With the exception of Trust Fund loans. For World Bank practice in its World Debt Tables see the November 1980 edition (para. 29, p. xxviii). See Appendix IX.4.
56. The Extended Fund Facility (EFF) little used in the past (partly because of the very strict conditionality attached to its use) has come into use in several countries, including Zambia. The Supplementary (Witteveen) Facility was established largely for the needs of countries (principally LDCs) affected by severe payments imbalances. Added to this the higher credit tranches have been much more extensively used as the LDCs have needed more external assistance. See Appendix IX.4.
57. The package included SDR 250 million from normal credit tranches, SDR 49 million under the compensatory financing facility (CFF), a loan of at least SDR 16 million from the Trust Fund and the rescheduling of a repayment obligation under a previous CFF drawing. (See IMF press release no. 78/26 of 26 April 1978, reproduced in IMF Survey of 8 May 1978 (p. 142) and the statement by the Minister of Finance to the National Assembly - footnote 50 above).

58. The size of this second package became possible under the IMF's Enlarged Access Policy (EAP) which provided SDR 674 million of the total. The ordinary resources of the EFF accounted for SDR 126 million (see IMF press release no. 81/36 of 11 May 1981, reproduced in IMF Survey of 18 May 1981).
59. A brief outline of the policy measures is contained in IMF press release no. 81/36 of 11 May 1981 - see footnote 58.
60. Based on the definition in Appendix IX.1.
61. See Appendix IX.1 for full definitions.

CHAPTER 10 THE EXPERIENCE OF MAJOR COPPER-EXPORTING NATIONS

10.1 Introduction

Several comparisons have been made in preceding chapters involving Zambia and other groups of countries, principally those exporting primary commodities. It is particularly instructive to compare Zambia's experience - as a result of its export concentration and the deterioration in its terms of trade - with that of other major copper exporting developing countries. For this purpose the three other founder members of CIPEC (1), the copper exporters' organisation, Chile, Peru and Zaire are examined, together with Papua New Guinea, a more recent member which started to export copper in 1972, and a country with approximately the same level of per capita income as Zambia. Some important macro-economic variables are tabulated for each country and a brief review is made of significant stabilization or structural adjustment policies in response to deteriorating conditions for external trade.

At the outset it should be noted that because Papua New Guinea did not start to produce or export copper until 1972, and because the comparisons are made for the period 1965 to 1980, the characteristics or performance of this country may be at variance with those of the other four countries. Thus in many of the comparisons it may be implicitly assumed that Papua New Guinea is exceptional, even though, to avoid repetition, specific reference is not made to this fact.

10.2 Economic structure and performance

Tables 10.1, 10.2 and 10.3 provide summary data on the structural characteristics of the five economies, and on their relative growth performance. There is found to be considerable variation in the extent to which the five depend on copper mining (Table 10.1), especially in the proportion of export earnings derived from copper. Zambia is seen to be by far the most heavily reliant on this commodity, and also to have been relatively unsuccessful in reducing this dependence. The fall in the contribution of copper to total value added in Zambia is attributed more to the fall in price and relative decline of its value added (in current prices) - see Chapter 3 for further discussion of this point.

Examination of Table 10.2 suggests that the two South American producers have developed more 'open' economies in the sense of having increased the share of exports in gross domestic product, while precisely the opposite has occurred in the two African countries. In the case of Chile the rising share of exports was achieved in spite of the same deterioration in the international purchasing power of copper by expanding copper exports (by 86 per cent between 1965 and 1979) while simultaneously expanding other exports - the nominal dollar value of copper exports showed an approximate threefold increase while total exports increased nearly sixfold in the same period of 1965 to 1979. By contrast the volume of Zambia's copper exports declined slightly during the period under review, and, since attempts at diversification were negligible, Zambia's external

Table 10.1 Relative importance of mining in economic activity
major copper exporters

	Percentage contribution of mining to total value added (a)		Percentage contribution of copper (b) to total exports	
	1965	1977	1965	1979
Chile	9.9	5.0	79	48
Peru	...	7.6	18	19
Papua New Guinea	0.5	13.4	--	52
Zaire	...	8.8	55	36
Zambia	41.5	11.4	90	83

Sources: Exports data calculated from International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington: International Monetary Fund.

Value added data calculated from United Nations, Yearbook of National Accounts Statistics, New York: United Nations (1974 and 1979 editions).

(a) Gross domestic product (GDP) in mining and quarrying expressed in current prices divided by total GDP.

(b) Excludes all other mineral exports including by-products.

(c) 1974.

Table 10.2 Proportionate structure of gross domestic product by type of final expenditure:
major copper exporters

(Percentages)

	Chile		Peru		Papua New Guinea		Zaire		Zambia	
	1965	1979	1965	1979	1965	1979	1965	1979	1965	1979
Government consumption	12	13	11	10	33	24	18	16	12	26
Private consumption	69	69	72	65	64	53	44	72	48	45
Gross fixed capital formation	15	15	17	14	17	20	28	15	19	19
Increase in stocks	4	6	2	--	3	3	--	1	5	3
Exports	15	23	18	30	19	46	70	22	52	45
Less imports	-15	-26	-19	-19	-35	-46	-60	-26	-37	-37

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington: International Monetary Fund.

Table 10.3 Trend growth rates (a) of gross domestic product in major copper exporting countries, 1965-80

(Per cent per annum)

	1965-70	1970-75	1975-80	1965-80
Chile	4.2	-0.3	7.7	3.0
Peru	3.8	5.7	1.0	3.9
Papua New Guinea	5.7	5.3	1.9	5.4
Zaire	7.4	3.3	-2.4	3.3
Zambia	3.6	3.2	-1.5	3.0

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington: International Monetary Fund.

(a) Trend growth rates based on 1975 prices.

position at the end of the 1970s was very much weaker, by comparison both with Chile and with the position in 1965.

Other features in which Zambia appears to vary from the other copper exporters emerge from Table 10.2. Private consumption expenditure accounts for a consistently lower proportion of GDP than in the other countries, while government consumption expenditure more than doubled its share between 1965 and 1979, in contrast with the other four countries where the government's share was steady or fell slightly. Zambia is also unusual in the proportion of GDP devoted to gross fixed capital formation - the two years shown here are atypical in this respect - and it was not unusual for as high a proportion as 30 per cent to occur (3), considerably higher than the investment ratios achieved in other countries. Possible explanations for this are heavy investment in infrastructural projects, higher capital consumption (retirements from the capital stock), and declining utilization of capacity.

Finally it is noted that, although the share of exports in GDP fell in Zambia, it remained by far the most open of the five economies (with the possible exception of Papua New Guinea) and hence the most vulnerable to external shocks.

Table 10.3 shows that the growth performance of the major exporters between 1965 and 1980 was remarkably similar (Papua New Guinea's growth was boosted by the advent of copper mining in 1972), but that the pattern of this growth when shorter periods are taken was not at all uniform. The growth of GDP in Zaire and Zambia

followed a very similar path with the rates declining throughout the 1970s, reflecting in both cases deteriorating external terms of trade. The performance of Chile and Peru differed both from the African producers and from each other. The former achieved a resurgence of growth assisted by substantial support from the international banks in the late 1970s following structural changes such as substantial regressive income distribution and the reallocation of resources from the public to the private sectors. The effects of some of Chile's "stabilization" policies are discussed in Diaz-Alejandro (1981) and Foxley (1981). Peru's growth in the early 1970s may be attributed to its more diversified export structure enabling it to benefit from the 1973-74 commodities "boom" before the effects of higher oil prices and further terms of trade losses led to a reduction in the rate of growth after 1975. Cline (1981b) also attributes this growth and later economic instability to "excess demand" policies pursued by the government. Chile's experience shows that it was not entirely impossible to maintain economic growth in spite of the declining terms of trade, but the social, political and economic costs of this would almost certainly have proved unacceptable to the other countries.

One of the costs sometimes associated with higher rates of growth is an escalation of the rate of inflation, for instance where governments attempt to promote growth by deficit financing. Table 10.4 provides little support for this view, since high growth and inflation do not appear to coincide either in terms of cross country or time series analysis. No attempt is made here at any

Table 10.4 Price inflation (a) in major copper exporting countries,
1965-80

(Per cent per annum)

	1965-70	1970-75	1975-80	1965-80
Chile	26.1	225.6	66.0	113.4
Peru	10.4	12.1	51.5	19.9
Papua New Guinea	...	12.6 (b)	6.6	... (c)
Zaire	25.9	18.6	68.4	31.8
Zambia	6.3	7.1	15.2	9.1

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington: International Monetary Fund.

(a) Trend annual rates of change of national indices of consumer prices.

(b) 1971-75.

(c) For 1971-80 the trend rate of change was 9.3 per cent.

systematic analysis of this relationship, since it has been examined at considerable length elsewhere, notably in the recent collections of papers in Cline and Weintraub (1981) and Cline (1981a). There is considerable divergence among the countries with respect to the actual levels of inflation, with Zambia performing creditably by the standards of the other countries (again with the exception of Papua New Guinea). There is a pattern of accelerating inflation after 1975 in Peru, Zaire and Zambia, and this can be said to be broadly in line with global trends. Nevertheless the fact that Zambia's rate of inflation barely doubled between the first and second halves of the 1970s contrasts sharply with the approximately fourfold increase in Peru and Zaire. It is clear from this very brief review that the experience of inflation among the copper exporting nations can have little to do with their status as copper producers, and explanations unique to each must be sought. This is not attempted here in any systematic way.

10.3 The balance of payments

Given that all the countries under review are copper exporters no separate appraisal of their terms of trade is undertaken in this chapter (4). Table 10.5 shows the effects on their balances of payments of the declining real value of their principal export. The pattern of deterioration is common to all countries: the steady decline from trade surpluses and positive balances on current account in the 1960s to much smaller (or negative) trade surpluses and very large current account deficits by the end of the 1970s. Zambia's

Table 10.5 Balance of payments indicators (a):
major copper exporting countries, 1965-79

	1965-69	1970-74	1975-79
(Millions of U.S. dollars)			
Trade balance (d)			
Chile	260	79	-28
Peru	70	48	-110
Papua New Guinea	...	109 (c)	103
Zaire	209	62	...
Zambia	333	391	265
Current account balance			
Chile	-22	-266	-635
Peru	-136	-170	-645
Papua New Guinea	...	133	42
Zaire	15	-261	...
Zambia	129	-41	-226
(Number of months' imports)			
Reserve ratio (b)			
Chile	2.3	1.9	2.6
Peru	1.8	6.4	4.0
Papua New Guinea	...	0.8 (c)	6.1
Zaire	3.1	2.3	2.4
Zambia	6.0	4.8	1.2

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington: International Monetary Fund.

(a) Annual averages for each period.

(b) Gross international reserves at year end divided by annual imports X 12.

(c) 1972-74.

(d) Difference between merchandise exports and imports (both f.o.b.).

performance is notable only insofar as the deterioration in its average trade balance was rather less serious than most, although the current account swung into substantial deficit. Thus again it can be noted that Zambia made reasonable efforts (and perhaps more successful than most) to control the level of its imports, but that the "invisible" account represented a severe drain on the balance of payments. This latter feature is probably due to the increasing cost of transportation (5), the high cost of maintaining a large "expatriate" skilled work force, and the rapid increase in the costs of servicing the country's external indebtedness.

In one respect the deteriorating external position is reflected more seriously in Zambia than elsewhere: the level of its gross international reserves relative to its import requirements fell very much more sharply and consistently than in the other countries, indicating the extent to which it resorted to the decumulation of reserves (and the incurrence of external payments arrears) as a means of financing its attempts at adjustment, particularly in the years of the early 1970s.

A more conventional response to a balance of payments disequilibrium is the "adjustment" of the exchange rate, normally a devaluation to act as a disincentive to imported goods, and to promote the relative competitiveness of domestically produced traded goods. This policy has been adopted in each of Chile, Peru and Zaire, whose currencies have each been devalued relative to the SDR by over 90 per cent since 1965, while the Zambian currency depreciated by only 30 per cent.

Papua New Guinea is again seen to vary from the others: its currency actually appreciated between 1975 and 1980. This is the result of its government's "strong" currency policy, that is deliberately supporting the exchange rate as a counter-inflationary policy (6). While this may be warranted at present it is unlikely that the policy will survive indefinitely. As soon as Papuan costs of production rise to comparable levels with the other countries (its copper is currently produced by cheap open pit methods), domestic copper producers' profitability will decline and the exchange rate may have to be lowered to protect the export industry.

The difference with respect to exchange rate policy between Zambia on one hand and Chile, Peru and Zaire on the other may well explain why Zambia's international reserves were depleted rather more drastically than those of the other three. But more importantly, it must also provide a highly plausible reason for the very much higher rates of inflation in the other countries than in Zambia. All are open economies (Zambia more so than most) and any increase in the price of imported goods (capital equipment or intermediate inputs, say) must inevitably be reflected in the index of domestic prices. Thus Zambia reacted to external imbalance by financing the resource gap created by the deteriorating terms of trade from the decumulation of reserves and the accumulation of external payments arrears. This latter feature accounts for the fact that Zambia's growth of external indebtedness (see Table 10.7) was not apparently different from that of the other copper exporters (7). Moreover Zambia's ability to accumulate these arrears may also explain why it was the only one

Table 10.6 Indices of exchange rates: major copper exporters, 1965-80

(SDRs per national currency unit (1975 = 100))

	1965	1970	1975	1980	Proportional change: 1965-80
Chile	247,525	81,155	100	20	-99.99
Peru	196	136	100	12	-93.9
Papua New Guinea	104	104	100	113	8.7
Zaire	355	117	100	15	-95.8
Zambia	106	106	100	74	-30.2

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington: International Monetary Fund.

Table 10.7 Growth (a) of external indebtedness and debt service:
major copper exporters, 1970-79

(Per cent per annum)

	Debt outstanding and disbursed	Debt service (b)
Chile	10	23
Peru	31	...
Zaire	20	25
Zambia	20	25

Source: Calculated from N.C. Hope (1981) (Table 5, page 30) and
Appendix S Table S.9.1.

- (a) Geometric mean annual growth rate.
- (b) Amortization and interest.

of the four main exporters to avoid formal debt renegotiation, a point discussed in Chapter 9.

10.4 Government finance

One of the principal features of Zambia's economic instability was the development of large government financial deficits from 1975 which became persistent and chronic. Table 10.8 shows that Zambia was not alone among the major copper producers in incurring such large deficits, and also, in the case of Zambia, at least, that the overall deficit as a percentage of total expenditure was much higher than in the non-oil exporting developing countries.

Comparative data for government financial operations are only available after 1972, but this period breaks conveniently into two: the three years up to and including 1974 (in which the commodity price boom came to an end) and the years 1975-78 when copper prices (and those of other commodities) remained depressed relative to other world export prices. The behaviour of Zambia's government financial balance is at odds with the experience of the other three major exporters (Chile, Peru and Zaire) when these two periods are compared. In each of the other three countries the overall deficit of the government declined or was static relative to total expenditure (as shown by the first column of Table 10.8), while in Zambia there was a significant increase. In view of the decline of copper prices, and the consequent loss of tax revenue to all governments concerned, this is at first sight a surprising conclusion. Three

Table 10.8 Relative size and sources of financing of central government surplus/deficit in major copper producing nations, 1972-78

(As a percentage of total expenditure and net lending)

	Overall surplus/deficit	Financing abroad	Domestic financing		
			Total (of which)	Monetary authorities	Commercial banks
<u>1972-74 (a)</u>					
Chile	-21.0	0.7	20.3	21.6	-3.1
Peru	-15.0	...	...	...	...
Papua New Guinea	...	...	...	...	...
Zaire	-26.3	14.8	11.5	11.0	0.6
Zambia	-20.7	9.8	10.9	...	...
Non-oil developing countries	-14.4	4.7	14.1	4.5	2.2
<u>1975-78 (a)</u>					
Chile	-0.9	-4.5	5.4	2.5	-6.7
Peru	-14.6	...	...	...	...
Papua New Guinea	-7.8	3.4	4.4	...	...
Zaire	-21.5	10.5	26.3	25.2	1.3
Zambia	-37.1	4.1	33.1	...	...
Non-oil developing countries	-16.03	5.0	14.6	7.1	2.3

Source: Calculated from International Monetary Fund, Government Finance Statistics Yearbook, 1980 and 1981, Washington: International Monetary Fund.

(a) Annual averages - simple arithmetic mean of annual percentages.

possible explanations are proposed: firstly that the other three governments used the budget as a means of demand management, increasing the deficit in the 1972-74 period when external conditions were favourable, and contracting it in the post-1974 economic recession which affected most non-oil exporting countries. That they might have been in a position to be able to do this, is associated with the second and third points. The second is that the Zambian government was almost certainly more heavily dependent on revenue from copper mining than any of the other major producers (7), so that the decline in "real" copper prices caused a much more serious revenue loss. Thirdly, the Zambian system of mineral taxation was entirely profit based, so that (as was noted in Chapter 8) when the mining companies incurred substantial losses in the late 1970s their liability to any form of taxation ceased. The other exporters retained some form of taxation related to the volume of production or export, thus providing protection against the loss of tax revenue.

Another way in which Zambia contrasts with the other copper exporters, particularly in the period 1975-78, is its heavy reliance on domestic financing, and in particular that provided by the monetary authorities. Thus in the latter period nearly 90 per cent of the overall deficit was financed from domestic sources and, as was seen in Chapter 8, almost all of this took the form of short-term borrowing from the banking system. The rising deficit in Zambia and the increasing resort to bank financing for this deficit, represent the classic prescription for inflation, and yet (as shown in section 10.2) Zambia's record of inflation was markedly better than

that of the other three major exporters. The reasons for this will be discussed in the next section.

The very brief discussion of this section is inadequate to explain the differences in the structure of funding government operations, and explanations must be sought in the major differences which exist apart from those involving the production and export of copper. One such analysis which could be undertaken is that of the structure of government expenditure patterns as illustrated by Table 10.9. This table reveals the idiosyncratic differences which exist, and it is difficult to identify any features which are common to all producers, or which might provide any explanation for the particularly poor performance of the Zambian economy. It is however noted that the proportion of total expenditure devoted to capital suffered the largest fall in terms of its proportionate share, although even here the fall in the case of Chile was only slightly less. Zambia is also seen to be unusual in the extent to which the budget is used as a means of financing non-government operations, a point demonstrated by the size of "net lending" in Table 10.9. This was discussed at some length in Chapter 8 (section 8.4.4). It is recalled that this need arises because of the low profitability of the parastatal sector, a result of poor supply conditions (particularly for imported goods) and restrictions on parastatal companies' freedom to vary the prices of their products.

Table 10.9 Proportionate structure of government expenditure in major copper producers

	1972					1978				
	Chile	Peru	Papua New Guinea	Zaire	Zambia	Chile	Peru	Papua New Guinea	Zaire	Zambia
1. Current expenditure	77.2	67.1	...	75.0	69.5	86.5	76.7	85.3	82.3	64.0
Of which:										
1.1 Expenditure on goods and services	38.6	50.6	...	64.3	52.2	40.8	43.9	67.1	65.5	44.7
Wages and salaries	(28.7)	(30.9)	(...)	(39.7)	(21.6)	(27.3)	(...)	(37.2)	(43.0)	(24.0)
Other goods and services	(9.9)	(6.0)	(...)	(24.7)	(30.6)	(11.3)	(...)	(29.8)	(22.5)	(20.1)
1.2 Subsidies	37.6	5.8	...	8.2	12.5	40.9	12.3	10.4	8.7	10.7
1.3 Interest	1.0	4.4	...	2.5	4.4	4.8	20.5	7.9	8.1	8.7
2. Capital	19.8	25.9	...	24.6	21.8	11.8	23.3	13.8	17.8	10.3
3. Net lending	3.0	7.0	...	0.4	8.7	1.7	--	0.9	-0.1	25.7

Source: Calculated from International Monetary Fund, Government Finance Statistics Yearbook, 1981, Washington: International Monetary Fund.

10.5 Monetary aggregates

Analysis of broad monetary aggregates provides various insights into the macro-economic performance of a country and the factors which influence those variables.

Table 10.10 shows substantial variation among the five countries under review in terms of the growth of the money supply. Both broad and narrow definitions of the money supply reveal similar patterns for both inter-temporal and inter-country comparisons, so no distinction between the two is made in this brief discussion. Both Zaire and Zambia experienced high rates of monetary growth in the late 1960s, which moderated in the first half of the 1970s. In the case of Zambia monetary growth continued to be relatively low in the late 1970s also, while Zaire experienced a rapid expansion. The Peruvian pattern was one of a fairly steadily rising annual average rate of growth, from an initially high rate in the 1960s. It was Chile which experienced the most rapid growth, particularly in the period 1970-75, and although a large deceleration was achieved in subsequent years that country's monetary growth remained very high relative both to the other copper exporting nations and to the rest of the world. Perhaps the most striking feature of Table 10.10, as far as Zambia is concerned, is the extent to which its monetary growth was below that of the other three major copper exporters in the second half of the 1970s, and its apparent success in preventing a rise in the rate of monetary expansion. It is instructive to examine the sources of monetary growth in these countries, for an explanation of this phenomenon.

Table 10.10 Trend growth rates of money supply: major copper exporters, 1965-80

(Per cent per annum)

	1965-70	1970-75	1975-80	1965-80
<u>Narrow definition (a)</u>				
Chile	...	223	88	163(c)
Peru	19	26	43	28
Papua New Guinea	...	...	8	...
Zaire	25	22	42	27
Zambia	20	11	10	12
<u>Broad definition (b)</u>				
Chile	...	259	97	181(c)
Peru	20	23	55	27
Papua New Guinea	...	...	20	...
Zaire	27	24	42	26
Zambia	27	8	12	14

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington: International Monetary Fund.

(a) Money or "M₁".

(b) Money + quasi-money or "M₃".

(c) 1970-80.

Table 10.11 analyses the total change in the money supply, during the years indicated, among its major components, and a number of significant variations among the countries emerge. It is noted that in the three countries for which data are available in the period 1965-70 the growth of net foreign assets made a positive contribution to monetary growth; in general, after 1970 foreign assets came to exert a negative or restraining influence on monetary growth. This was particularly true of Chile between 1970 and 1975, and even more so for Zambia during the whole of the 1970s. Indeed in the case of Zambia it is noted that "other items", which included the accumulation of external payments arrears (in reality a foreign liability), also exerted a strongly negative influence on monetary growth. Thus, the use by most of these countries of their foreign reserves to finance declining real export earnings, served to reduce the impact on the money supply of the very high rates of domestic credit expansion.

There is no doubt that domestic credit was expanded rapidly in these countries during the 1970s, but there is a further feature of some significance. In Peru the major source of domestic credit expansion was (claims on) the private sector, while in Zaire and Zambia the main source was the government sector, particularly in the period 1975-80. In Chile a very substantial change occurred in which government credit accounted for almost all of domestic credit between 1970 and 1975, but in the subsequent five years credit expansion was attributable almost entirely to the private sector. In this latter case the expansion is almost certainly a

Table 10.11 Components of changes in the money supply:
major copper exporters (a), 1965-80

(Percentages)

	1965-70	1970-75	1975-80
<u>Chile</u>			
Net foreign assets	...	-116	3
Domestic credit expansion	...	274	182
Claims on government	...	(233)	(12)
Claims on private sector	...	(41)	(170)
Other items (b)	...	-58	-85
<u>Peru</u>			
Net foreign assets	38	-13	36
Domestic credit expansion	70	134	77
Claims on government	(18)	(31)	(23)
Claims on private sector	(53)	(103)	(55)
Other items (b)	-8	-21	-13
<u>Papua New Guinea</u>			
Net foreign assets	...	...	32
Domestic credit expansion	...	...	77
Claims on government	(...)	(...)	(15)
Claims on private sector	(...)	(...)	(62)
Other items (b)	...	...	-10
<u>Zaire</u>			
Net foreign assets	71	-47	--
Domestic credit expansion	42	182	106
Claims on government	(19)	(101)	(78)
Claims on private sector	(23)	(81)	(28)
Other items (b)	-13	-35	-6
<u>Zambia</u>			
Net foreign assets	94	-319	-193
Domestic credit expansion	8	533	296
Claims on government	(-33)	(351)	(268)
Claims on private sector	(40)	(182)	(28)
Other items (b)	-2	-114	3

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington, International Monetary Fund.

(a) Changes in the money supply (broadly defined) derived as first differences from the identity for the corresponding stock variable:

$$\begin{aligned} \text{Money supply} = & \text{Net foreign assets} \\ & + \text{Domestic credit} \\ & - \text{Other items (net)} \end{aligned}$$

where domestic credit is defined to cover "Claims on government" and "Claims on private sector," the latter including all non-government sectors.

(b) Other banking system assets and liabilities: e.g., import deposits, certain bonds, in some cases arrears on external payments.

result of the Chilean government's decision to restrain the government deficit, and to promote the private sector in an economy which is substantially more advanced in terms of industrial diversification than either Zaire or Zambia. The very large proportional contribution of government credit expansion to monetary growth in Zambia is a reflection of the government's former dependence on mineral taxation as a revenue source, and the very poor condition of the non-government sector (including the parastatals) particularly after 1975.

Once again the evidence (of Table 10.11) does not provide conclusive support for a simple monetary explanation of inflation. For instance, Zambia would appear to have created the conditions in which the risk of stimulating inflation was highest: high government deficit financing financed by the banking system, with the result that, of all the countries covered in Table 10.11, domestic credit expansion was most rapid in Zambia, with the most "inflationary" source. Yet as Table 10.4 reveals, Zambia had by far the most satisfactory record of inflation. At least part of the explanation may lie in the factor to which attention was drawn in Chapter 8, the velocity of circulation of money.

Table 10.12 shows that Peru and Zaire had an income velocity of circulation of money which varied little during the three periods summarized at the foot of Table 10.12, although it is noted that Zaire's velocity revealed a tendency to fall. Data were not available for the 1960s in Chile but there was a marked increase in velocity after 1973 with the result that the average for the period

Table 10.12 Income velocity of circulation of money:
major copper exporters (a)

	Chile	Peru	PNG	Zaire	Zambia
1965	...	4.12	...	4.15	6.61
1966	...	4.34	...	3.71	5.84
1967	...	4.58	...	4.16	5.65
1968	...	5.08	...	4.75	4.86
1969	...	5.13	...	5.06	4.67
1970	5.71	4.39	...	4.45	3.57
1971	4.03	4.37	...	4.61	3.71
1972	2.85	3.94	...	4.13	3.92
1973	2.52	3.92	4.02	3.81	3.87
1974	4.59	3.62	3.25	3.60	4.30
1975	5.60	3.88	4.09	3.60	3.21
1976	7.35	4.32	3.85	3.74	3.11
1977	6.99	4.73	3.10	3.27	2.90
1978	5.56	4.68	3.12	2.89	3.53
1979	5.19	4.45	2.84	...	3.08
1980	4.74	3.94	...	...	...
Averages (c)					
1965-69	...	4.7	...	4.4	5.5
1970-74	3.9	4.0	...	4.1	3.9
1975-79	6.1	4.4	3.4	3.4 (b)	3.2

Source: Calculated from International Monetary Fund, International Financial Statistics Yearbook, 1980, Washington, International Monetary Fund.

- (a) Gross domestic product divided by money supply (broadly defined, i.e., "M₃").
 (b) 1975-78.
 (c) Simple arithmetic mean of observations for the years in question.

1975-79 was substantially higher than that of the previous five years. Thus in Chile the impact on inflation of any increase in the money supply would have been amplified by the rising velocity. By contrast, as was shown in Chapter 8, the inflationary potential created by the expansion of the money supply in Zambia was reduced by a velocity which fell markedly in the 1960s, and which continued to decline in the 1970s. The evidence of Table 10.12 also supports earlier conclusions that although Zambia's income velocity may initially have been high by international standards, by the end of the 1970s it had reached a level below which it was unlikely to fall. Thus although in the 1970s its potential inflation may have been restrained by a falling velocity of circulation there is little prospect that this will continue in the future.

10.6 Conclusion

This brief review has shown that although the major copper producing nations faced similar external conditions during the 1970s, the impact on their domestic economies was markedly different. But these different reactions are more likely to be associated with the particular socio-economic and political circumstances of the countries than with their status as exporters of copper. It was, however, noted that Zambia did show some variation from the other three main exporters, Chile, Peru and Zaire, particularly with respect to the financial macro-economic variables. Thus Zambia relied more heavily on the decumulation of its net foreign reserves to finance its worsening current account imbalance, rather than pursuing

a more active policy of exchange rate devaluation, with the result that the Zambian kwacha depreciated by a very much smaller proportion than the currencies of the other three. Possibly as a result of this, its inflationary record was by far the most satisfactory, and it did not suffer the very high (almost hyper-inflationary) rates experienced by the other three in the late 1970s. On the other hand the growth of real output in Zambia (in common with that of Zaire) was very slow, and indeed negative growth rates occurred in the second half of the 1970s. It can only be asserted once again that Zambia's difficulties arose largely from its higher degree of export concentration, and the coincidence of declining net terms of trade and the falling volume of its dominant export.

Notes

1. The organisation of copper exporting nations is the Conseil Intergouvernemental Pays Exportateurs de Cuivre (CIPEC), i.e., the Inter-governmental council of copper exporting countries.
2. Figures calculated from data in International Monetary Fund, International Financial Statistics Yearbook, 1981, Washington: International Monetary Fund.
3. See Table 3.7 for further details of Zambia's record of accumulation of fixed capital.
4. But see Chapter 7, section 7.4. The terms of trade of these countries were considerably more seriously affected than most, as an examination of Appendix S Tables S.5.2 and S.5.3 reveals.
5. See Chapter 7, section 7.7.
6. The policy is described in a mimeographed paper of the country's economic management (Papua New Guinea, 1979a).

7. Zambia's external indebtedness was contrasted with that of the ten countries which sought debt renegotiation after 1975 in Chapter 9, section 9.5. Among these ten were Chile, Peru and Zaire.
8. International data sources do not permit detailed analysis of this assertion. Zaire, which is closest to Zambia in terms of government revenue structure, was able to maintain profitability (or reduce losses) more successfully than Zambia because of the existence of cobalt and other more stable commodities.

CHAPTER 11 STABILIZATION WITH GROWTH

11.1 Introduction

The contention of this thesis is that Zambia's economic decline has been directly caused by adverse external conditions, but that an unbalanced structure has hastened this decline. Zambia is clearly not alone among developing countries in having suffered severely as a consequence of the unstable global economic conditions of the 1970s, although the evidence with respect to copper prices (chapter 5, section 5.5) and the instability of export earnings (chapter 7, section 7.3) is that it was among the most seriously affected. In common with many of the other developing countries Zambia has made extensive use of the facilities of the International Monetary Fund (IMF), and in consequence its economic policies have been very strongly influenced by the conditionality and domestic policy orientation of the Fund.

In this concluding chapter a short review is made of the experience of some LDCs in carrying out structural adjustment or stabilization policies during the 1970s. This provides a basis for assessing the policies which Zambia has adopted and more importantly for suggesting measures for the future. Specific attention is paid to the policy content of the 1978 and 1981 programmes in Zambia.

This chapter also contains two other features: the first is a report of an attempt to construct a simulation model for the Zambian macro-economy, elaborated in Appendix XI.1. The second innovation is the development of an idea occasionally discussed in primary producing countries (and given official recognition in Zambia's Third National Development Plan) for the establishment of what is termed here a Development Stabilization Fund, designed to stabilize the flow of resources from the mineral sector to the government budget, and hence to stabilize the annual expenditure. Possible guidelines for the operation of the fund are suggested and its effects on the government budget are simulated.

11.2 Structural adjustment and stabilization in LDCs

11.2.1 Country experience. In chapter 1 of this study it was noted that there were many limitations to orthodox "stabilization" policies, and that there were certain a priori reasons to expect that classical analysis (and hence policy prescriptions) would be inappropriate, and could in fact be destabilizing. Stabilization policies can profitably be regarded as a sub-set of a more general class of policies generally termed "structural adjustment". This latter concept has become the subject of considerable attention: it was for instance implicitly at the centre of many of the papers in Cline and Weintraub (1981), and is more specifically discussed in the World Development Report 1981 (World Bank, 1981).

The latter of these two studies includes an extensive survey of country experiences in the years from 1974, considered both individually and as members of several country groupings. It is immediately apparent from the World Bank's conclusions that there was a wide variation in the severity of the impact on the developing countries of the oil price revolution and the subsequent global instability. Of the four broad categories (1) of countries studied, the World Bank concludes that the "primary-producing" oil-importing developing countries suffered the most serious balance of payments effects even though the results suggested that (as a group) they had the most favorable export price developments (2); offsetting this was a particularly severe import price effect (possibly a consequence of their more open economies), and also a general decline in export volume (3). The World Bank identifies three main modes of adjustment:

- structural adjustment divided between
 - (i) export expansion
 - (ii) import substitution
- additional real external financing and
- slower growth.

In the primary producing countries as a group by far the largest source of adjustment was the resort to additional external financing, implying an increase in the burden of external indebtedness. Only a limited amount of the adjustment (about 20 per cent) came from fundamental structural adjustment.

In further expanding this analysis the World Bank concludes that, especially among the primary producing countries, those which adopted policies with an "outward-orientation" by and large were more successful in coping with the effects of the post-1974 world economy than those with an "inward-orientation". Outward-oriented policies were taken to be those which led to export-led growth, exploiting the country's comparative advantage, and using market-related incentives to promote production of export goods. Inward-oriented policies were those such as import substitution, and would also have involved rather greater "interference" in the market by the authorities, by measures such as import control, tighter tariff regimes and domestic price subsidization to reduce the immediate impact on consumers of rising world prices.

The general conclusions reached in the World Bank (1981) study are reinforced by Balassa (1981a) in his survey of a (non-random) sample of twelve developing countries. Both studies stress that, in the developing countries covered, internal shocks or domestic mismanagement were often as significant as external disturbances in explaining poor economic performance during the 1970s. Thus the policy response is critically important. For instance Balassa concludes that there was evidence that the overvaluation of the exchange rate could adversely affect exports unless export promoting policies were pursued; and also that negative (real) interest rates and rising government budget deficits both served to reduce savings ratios (and by implication the growth rate of domestic output). Although Liebenthal (1981)

seems largely to support this policy stance, his survey of four African countries (4) serves to emphasize that the African countries suffered much more severely than most others from the shocks of the 1970s. Adjustment there is seen to have taken the form of reduced output, to the extent that in several countries per capita income was lower at the end of the 1970s than at the start. But he also stresses the structural problem which the African countries faced - even if no large international shock had occurred their growth would have been restrained by the same constraints which afflicted Zambia (see chapters 2 and 3 of this study).

11.2.2 Structural adjustment policies. Balassa (1981b) presents a package of policies which might form the basis for a structural adjustment programme in response to the specific economic problems of the late 1970s, and these are discussed here in outline in order to provide a frame of reference for later sections of the chapter. The policies are divided into three broad categories: incentives for production, incentives to save and invest, and public sector policies.

The first of the incentives to production is a phased relaxation of price control in order to promote more efficient resource allocation, although this is a valid target only where individual or enterprises have adequate purchasing power; for instance, there is no incentive to a subsistence farmer to produce cash crops, no matter how high the producer price of the crop may be, if he is unable to purchase inputs (seeds, fertilizer,

etc.) because no credit facilities are available or physical supply constraints exist. A second class of policies include the exchange rate, import protection, and export subsidization which are shown to be substitutable or complementary in effect. Balassa favours a policy mix consisting of a selective reduction of import tariffs combined with a devaluation in order to compensate partially for the reduction in relative import prices. The devaluation would also have the effect of raising the prices of exports (expressed in domestic prices) thus acting as an incentive to producers even if it did not improve the price competitiveness of the commodity in question. Export subsidies were favoured only as a temporary measure, in order to stimulate infant industries, and other measures might include export credit (or credit guarantee) schemes. One reason for shying away from export subsidies appeared to be the fear of retaliation by other (and possibly more established) producers, an argument which would apply in differing degrees according to the product. Balassa also commends the gradual reform (over a period of 4 or 5 years) of the system of import protection, with as much tariff reduction as possible (to promote the competitive production of internationally traded goods), and replacing physical quotas or other forms of import control by tariffs.

The second category of policy action, incentives to save and invest, consists largely of the use of interest rates. A positive real interest rate is seen by Balassa as an effective

means of increasing the level of savings, although this is likely to have only a limited impact unless the system of financial intermediation is extended. Positive real interest rates would also discriminate against capital intensive investment, and, consequently, should reduce pressure on the balance of payment from imported capital goods. Without elaboration, Balassa favours taxes (or exemptions) that are neutral in their effects on capital intensity: existing measures frequently are capital-biased, allowing accelerated depreciation or low tariffs on capital goods to investors.

The third category of policies relates to the public sector. Here action is urged to promote the effectiveness and consistency of the appraisal of projects undertaken by the public sector. Balassa also favours the reduction of the government deficit where this is large, although reservations are stated: current expenditure should be reduced in preference to capital, and within current expenditure categories, "public consumption" should be the first to be reduced. Finally, he suggests that certain sectors require particular attention; for instance, in agriculture output can be stimulated by such measures as government-supported research, extension services, and the provision of infrastructure (roads and transportation facilities, etc.).

11.2.3 Stabilization and the role of the IMF. The foregoing discussion is clearly related to objectives which require a number

of years (and a gradual approach) to accomplish, and this must be a key feature of the fundamental alterations which comprise a structural adjustment programme. It was noted in chapter 1 that even if the International Monetary Fund (IMF) were concerned to assist long-term structural adjustment, its Articles of Agreement compelled it to adopt a short-term horizon; the longest repurchase period on any facility was eight years, and the majority of its operations would have a very much shorter life, of the order of three years (see Appendix IX.4 for full details of facilities). It was also argued that the IMF's primary concern with the balance of payments would cause it to be pre-occupied with policies designed to correct external imbalances in the short-run. Thus Fund-supported programmes might well be acting in similar areas to those outlined in section 11.2.2, but possibly with different objectives and horizons. In this way an IMF-style stabilization programme might be seen as a special (and perhaps more restricted) case of structural adjustment policies (see chapter 1).

Critics of the Fund argue that its policies are inimical to the interests of the developing countries (e.g. see Payer (1974)). The present study takes a more agnostic view, rather in line with the conclusions of Bird (1981) and Killick (1981b and 1982). Bird recognizes that the finance provided by the IMF is short-term, but for the individual country in balance of payments difficulties there is little option but to accept this and the similarly short-term conditions which are attached to it. If

the country has a payments imbalance then some form of corrective action is unavoidable. It is then necessary to construct the appropriate package of policies, and it is at this point that other criticisms of the Fund might be put forward. The theoretical foundations of the IMF's stabilization policies may be summarized as the "monetary approach to the balance of payments" (5) (see International Monetary Fund (1977) and Johnson and Frenkel (1976)), which suggest that the control of domestic credit and monetary expansion by its action on domestic economic activity will be sufficient (and necessary) to correct the payments imbalance. As Bird points out, there are few who would deny that an unduly rapid expansion of domestic credit will have adverse effects on the external balance, but what is in dispute is the degree of emphasis which should be given to monetary control alone. He suggests that the monetary approach comes into conflict with the "structuralist" position only where the structural alterations of the latter school require more (rather than less) government expenditures in the short-term in order to achieve the growth targets applied, the point being that the structuralist policies are believed to take longer to implement. Thus Bird argues that attention should be concentrated on minimizing the damage that is done by forcing the issue, that is by introducing policies which are too restrictive or insufficiently expansive.

Killick (1981b and 1982) goes some way to analysing the impact of stabilization programmes on the economies of developing

countries, and provides evidence on both positive and negative aspects - that is, on whether the programmes' objectives are achieved and whether the implementation of the programmes causes actual harm to the economies. In Killick (1981b) it is found that certain preconceptions can be dispelled. Firstly, performance criteria were found to be related largely to banking system credit and the overall government budget deficit or financing requirements, with no specific mention made of more detailed policy such as the exchange rate, wages and price or actual fiscal changes, although many agreements contain understandings that action would be taken in some of these areas. Secondly, he found that only a quarter to a third of IMF programmes had been associated with a currency devaluation. Thirdly, Killick's conclusion on the conditions attached to Fund programmes is characterized as "constrained conditionality"; that is, although the Fund is severely constrained in the flexibility of its programmes there is not a stereotyped package which typifies all programmes. Fourthly, there was a limited attempt to adapt to the problems caused by the oil price increases in the 1970s, both by increasing its resources and by a superficial relaxation of some conditionality. Finally he suggests that the unevenness of treatment accorded to countries is not necessarily caused by ideological bias, but is a result of "politicking" among the Executive Directors, a feature which would presumably reflect the composition of the Executive Board (6), with the smaller countries unable to influence the outcome of discussions, regardless of the "hue" of their government.

Concerning the more specific impact of IMF programmes Killick (1982) found that they were largely ineffective on many scores. His statistical tests are reported as showing only low significance in a number of areas: improvements in the current account and the overall account of the balance of payments; a limited increase in net inflows of foreign capital; no systematic improvement in trade liberalization; no strong deflationary impact, with some evidence of an increase in GDP growth rates. Inflation was found to increase rather than decrease though the significance was also weak, and the impact on income distribution was complex with no systematic pattern emerging.

The evidence emerging from the Fund's own researchers is less equivocal. Johnson and Salop (1980) accept that redistribution may be inevitable in Fund programmes, with real wages falling and real profits rising in order to promote foreign capital inflows, while Khan and Knight (1981) find that real output and employment fall if sharply deflationary measures are applied, and this must be a risk if short-term Fund programmes are undertaken. However the papers by Crockett (1981) and Keller (1980) suggest or imply that these effects are only short-term.

The empirical evidence is thus ambiguous, but a positive conclusion can be made: IMF policies and the structure of its own resources for financing stabilization programmes need amending to take cognisance of the fundamental structural imbalances

its members have developed since the early 1970s. The point is again well illustrated by the Zambian economy as subsequent sections will show.

11.3 A digression: Modelling an unstable economy

In order to simulate the effects of policy proposals it is desirable to have a working model of the economy in question. Two approaches were contemplated: an input-output framework, which would allow full analysis of the inter-industry linkages in the economy; and an econometric model using regression techniques to estimate key macro-economic relationships.

The input-output approach (7) was considered only briefly and rejected on the grounds of data inadequacy. At the time of the proposed analysis (1981) the most recent input-output table for the economy was 1973, which was also the latest year for which a full set of national accounts was available. This was felt to form an inadequate basis for analysis for two reasons: firstly, in any rapidly changing economy, particularly one with a small but expanding manufacturing sector, the technical coefficients are unlikely to be sufficiently stable to justify analysis (simulation or forecasting) of economic developments which could be a decade or more removed from the original base; secondly the input-output table available pre-dated the first oil-price shock, and the subsequent commodity price boom and collapse, and related to a period when the economy was still

expanding. Moreover certain large investment projects were not completed until after 1973 - for instance the electricity generation installations at Kariba North Bank and Kafue and the Tanzania-Zambia railway. All these factors almost certainly had a substantial impact on sectoral linkages causing large variations in the technical coefficients matrix as well as in such vectors of coefficients as the import, labour and capital requirements. While it is true that a technique exists for updating input-output coefficients, a minimum amount of non-standard national accounting data for each year studied is still required (8) and this is not published in the Zambian national accounts.

Despite these comments the technique of input-output analysis is felt to be one which could profitably be applied by the Zambian authorities as a means of providing consistency checks for projections of sectoral supply and demand in their medium term planning exercises (9), but only after a satisfactory and prompt data base has been established.

A further reservation concerning the use of such techniques as input-output analysis is that insufficient account is taken of the distinction between current and constant price versions of the principal aggregates, and hence the presence of financial constraints may not be detected or adequately presented. The mining sector illustrates this well; value added measured in constant prices in the sector shows little variation from one

year to the other. However when expressed in current prices, value added can show very large changes, the direction of change depending almost entirely on the movement of the copper price (10).

This instability of value added and the associated financial constraints make it almost imperative to develop a model which incorporates both current and constant prices variants of the principal aggregates, particularly when dealing with such areas as the balance of payments, the government budget and the money supply all of which have been shown in this study to be vulnerable to instability imposed by export prices. If both current and constant price formulations are to be incorporated then the specification and estimation of a satisfactory price or inflation equation is imperative. As described in Appendix XI.1, this problem proved intractable; specifications based on both absolute price levels and rates of change were used, with a wide range of theoretical constructions (monetary and domestic credit expansion, cost-push based on wages, excess demand, and "imported" inflation). The only explanatory variable which consistently provided satisfactory statistical relationships was the price of imports, all other "domestic" explanations proving to be statistically insignificant or inconsistent with a priori expectations.

The modelling exercise proved to be less satisfactory than might have been expected from similar work in the past, such as the models used by Blitzer (1978), Nziramasanga and Obidegwu (1981) and McPherson (1978). As stated in Appendix XI.1 one reason for

the deterioration is that the present study used data for years up to 1980, whereas the latest year covered in any of three studies cited is 1976. Thus estimates or parameters in the present study are more heavily influenced by the post-1974 years, in which many of the key economic variables deteriorated sharply or became severely unstable. For instance, the estimation of production functions (both aggregate and sectoral) using a Cobb-Douglas form, yielded negative coefficients for labour, implying a negative marginal product for labour. While such an outcome may provide an insight into the actual behavior of output, it would be unstable as far as simulation is concerned, and would be even more unsatisfactory for the purpose of forecasting.

The model was further constrained by the fact that there is, as yet, insufficient data on the Zambian economy to support a simultaneous equation model. However the structure used in the model was recursive - that is the solution of each equation in any year depended on exogenous variables, lagged variables, or the values of endogenous variables obtained from equations higher in the structure. This approach does constrain the specification of some equations, but it is the closest approximation to a simultaneous system, and it also means that ordinary least squares estimation techniques provide unbiased and consistent estimators (11).

The model is not presented as an integral part of the thesis because, as it stands, it does not provide a satisfactory basis

for simulating the performance of the Zambian economy. In particular, the specification of the real output and price equations (and their lack of sensitivity to changes in other variables in the system) is unacceptably weak. Nevertheless the results in respect of some of the financial aggregates (the balance of payments, and the government budget) were sufficiently encouraging to believe that further development of the model might be of practical benefit for forecasting or planning.

Appendix XI.1 contains full details of the model's equations - specification and estimation - together with historical simulations designed to test the explanatory power of the model, and a summary of some of the experimental simulations which were performed to test various policy alternatives, some of which will be referred to in section 11.5.

The difficulty of establishing a satisfactory model is a further consequence of economic instability: the government is severely constrained in its ability to forecast the consequence of its own policy actions or external events and policy formulation in the context of long-term development becomes almost impossible.

11.4 The Zambian "stabilization" programmes: 1978 and 1981

Zambia's first substantial use of IMF facilities occurred in 1978, although there had been some drawings under the Compensatory Financing Facility after 1971 - see Jeker (1977) and Appendix S, Table 5.6.3. Two very large programmes became effective in 1978

and 1981 respectively, and consequently in both cases substantial conditionality was involved. In this section it is the stabilization or policy packages which are discussed; the volume of IMF resources drawn and the resulting servicing burden have been considered elsewhere in this study (12). The policy measures agreed between Zambia and the Fund are summarized in this section in the form reported by the Fund (13), and without comment or elaboration of the performance criteria attached to the programmes (14).

The 1978 programme had three specific objectives: to restore balance of payment equilibrium by 1980; to reduce inflation from 20 per cent to "a more acceptable level"; and to provide the setting for a resumption of economic growth. The policy measures adopted to achieve these were:

- a reduction in the budget deficit;
- a restoration of the "viability" of the mining companies;
- implementation of a prices and incomes policy;
- a devaluation of the kwacha against the US dollar by 10 per cent, simultaneously linking the kwacha to the SDR (the previous link was to the dollar);
- the gradual elimination of external payments arrears by 1980.

With the assistance of a surge in copper prices in 1979, a current account surplus was achieved in that year, a full year ahead of the target, profitability was restored to the mining

companies, and in 1979 some progress was made towards reducing the payments arrears. Inflation was reduced to about 12 per cent in 1980, and the government's net borrowing from the banking system was restrained in 1979. This was achieved at the cost of a very severe credit squeeze on non-government sectors (including both private and parastatal industry), and in 1979 GDP fell by about 8 per cent. Even the limited success with respect to the external financial position was to prove short-lived, since the second round of major oil price increases occurred towards the end of 1979 causing immediate deterioration in the terms of trade, and then a "second round" effect as world economic growth fell again, and commodity prices generally fell. Thus 1980 saw another substantial current account deficit and an increase in payments arrears, as well as a very large increase in the government's deficit. The prospects for a resumption of growth were minimal, and decline was more likely, unless further external financial assistance on a very large scale could be found.

Thus the second IMF programme was negotiated in 1980 and 1981. This second programme's objectives could be correctly identified as structural adjustment rather than stabilization, since both drawings and repurchases were scheduled for a longer period, and the policies agreed addressed some of the economy's defects more directly (particularly the agricultural sector and parastatal industry). Nevertheless the financial conditions were not inconsiderable and may present Zambia with serious

servicing problems in the later part of the 1980s - see Chapter 9, section 9.7 for further discussion of this.

The principal policy measures agreed were as follows:

- a three year investment programme designed to rehabilitate existing industries and to promote quick yielding projects;
- industrial importers to have priority in the allocation of foreign exchange;
- parastatal prices to be set at more "appropriate" levels;
- agricultural support service to be improved;
- producer prices for agricultural prices should be gradually moved towards world market levels;
- government expenditure should be "controlled" with particular attention being paid to subsidies, although at the same time more resources should be made available to service existing projects and to increase the level of capital expenditure;
- "Monetary and credit policies are designed to provide adequate credit for the productive sectors of the economy, while contributing to the containment of domestic demand pressures and the reduction of the overall balance of payments deficit";
- a "flexible" interest rate policy was to be introduced: a general rise in the interest rate structure was implemented in 1981.

These policies are discussed in the context of the general review contained in section 11.5.

11.5 The future direction of macroeconomic policy in Zambia

Given the depressed and unstable condition of the Zambian economy at the end of the 1970s and in the early 1980s, and assuming that no radical changes in international trading conditions are forthcoming, there seems little alternative to the type of structural adjustment policy outlined in the previous section. But several questions must be posed about this approach. Are the measures introduced adequate to ensure the restoration of growth, and indeed to achieve an increase of growth, within a reasonable period? If it is necessary for there to be "sacrifice" how can this be prevented from affecting the interests of the poorest sections of the population? Should the government continue to rely simply on the tools of macro-economic policy (particularly financial and monetary targets) to regulate or monitor future development? If government expenditure is to be more heavily constrained, then by what means is capital accumulation to be financed? Could past economic decline have been prevented, and can similar decline be forestalled in the future if further external "shocks" occur?

The last question is tellingly answered in a calculation by the World Bank, which is summarized in the following extract:

"(Zambia) might have succeeded in raising its non-mining exports to 20 per cent of the total by 1974 (implying that their volume would have increased by more than 20 per cent a year in 1965-75). If these non-traditional exports had continued to grow at 5 per cent a year after 1974 and had experienced moderately favourable price movements, and if food imports had been substituted by domestic production, about one-third of the fall in GDP from 1974 to 1978 could have been avoided. But even with those optimistic assumptions, two-thirds of the fall was unavoidable given Zambia's structural dependence on copper." (Author's own emphasis) (World Bank (1981, p.79)).

The conclusion must be that Zambia is just as vulnerable to external shocks in the early 1980s as at any time in the past; indeed is more so since the country no longer has the substantial accumulation of foreign reserves with which it started the previous decade. Moreover as time passes and viable reserves of copper are depleted, this vulnerability will increase unless there is a significant reduction in export concentration and overall dependence on copper mining. The first major such adjustment is in process already, namely changing the means of financing the government budget following the virtual cessation of revenue from the mining sector. At present this is being done by heavy borrowing from external sources and from the banking system, neither of which can continue indefinitely on their present scale. Such borrowing is justified only if it finances economic growth which will in turn provide new or larger sources of revenue to replace that which has been lost.

The following sub-sections contain a discussion of various issues or policies raised by the questions posed above or by the preceding sections.

11.5.1 The emphasis of policy. In current economic debate there is emerging a substantial body of opinion in favour of "supply-side" measures, but it is not clear that there is any consensus about which policies are included under this broad heading. Insofar as they are not "demand management" (control of the economy by means of fiscal policy and government expenditure) then the meaning is clear. Supply-side policies could range from a laissez-faire approach - removing government regulation to promote growth by private sector expansion - to a centralized directed economy in which the government or state enterprises are directly involved with the production process. Clearly Zambia needs to act on domestic supply or production, though neither of the extremes outlined above is advocated.

The evidence quoted in section 11.2 suggested that the more successful developing countries (in terms of economic growth if not necessarily distributional targets) were those which had adopted an outward-oriented approach, with as high a degree of export promotion and diversification as possible. It is also clear that two other areas of Zambian economic activity require rehabilitation or stimulating: manufacturing and marketed agricultural production. The former suffered a severe set-back with the decline of the country's capacity to import raw materials and

capital inputs - the lack of a foreign resource constraint in the early years of independence having led to the evolution of a capital- and import- intensive structure. Agriculture undoubtedly suffered from a decline in the rural/urban terms of trade, particularly as a result of falling producer prices relative to the general domestic price level. But agriculture has also developed along similar capital intensive lines to industry, and a redirection of policy is needed to promote the development of small-scale emergent production. While it is essential that farmers should have the necessary capital equipment and inputs, they must have access both to credit with which to purchase these and, even more important, they should have access to the skills which are necessary to increase their productivity. Such skills can be promoted by education particularly through the extension services.

Another issue is the means of financing industrial expansion, and this inevitably raises the issue of the ownership of industry. There are three alternatives: public ownership, private ownership by Zambian residents, and private ownership by foreign corporations. Even though foreign investment is explicitly encouraged by the Industrial Development Act passed in 1977 it is highly unlikely that a large new foreign capital inflow will occur until potential investors are convinced that Zambia is stable - both economically and politically. In this respect, the greater stability in the region resulting from the settlement in Zimbabwe in 1979 may eventually help to reassure potential investors. Private investment from domestic sources is also likely to be small given the

low level of domestic savings relative to former years, and also the heavy prior claim on savings which the government's current deficit represents. Thus the public sector will remain the principal source of new investment in the foreseeable future. Two major issues must be resolved: how will total public sector investment be divided between the government and the parastatal industries; and, will the parastatal sector be permitted to become largely financially independent of the government budget? In the author's opinion these issues should be resolved in favour of the parastatal sector, with each industry answerable to the shareholders (of which the government is usually the largest) through its board of directors on which the government is represented (the government often provides the chairman and one or more directors). This will require reform of price control.

This leads to the rather wider question of the degree of government direction of the economy - with respect to price control, import control, and central planning of the economy. Unless the government can control all prices (which in the case of imports it clearly can not) then the control of domestic prices will have one of two results: declining profit margins or the subsidization of producers by the government. The administrative burden of operating a comprehensive system of price control can become intolerable for a constrained government budget, and may reduce the efficiency of resource allocation. Similar observations apply to the system of foreign exchange allocation and import

control which has developed in Zambia since 1975, and a gradual attempt should be made to relax it.

With respect to planning, the author has written elsewhere concerning the inability of the planning machinery to cope with the particularly harsh instability with which Zambia has had to content (see Bell (1981b)). The essential problem is that the Zambian approach to planning is oriented to rigid five year plans whose projects must be completed before another plan commences, and which might be characterized as medium term government capital budgets. The three main plans to date have allowed little or no room for adjustment in the light of changing circumstances (15). Moreover there was found to be an extraordinary lack of coordination between the government agencies dealing with planning and finance. Although the Third National Development Plan talks of the public sector occupying the "commanding heights" of the economy (Republic of Zambia, 1979, p. iv) the plans have all been largely indicative (16), particularly with respect to the parastatal and private sectors where these have been considered at all.

In summary the objective of structural adjustment in Zambia should be to establish industry based upon more labour-intensive techniques, using domestic raw materials (largely agricultural) with a significant component being directed to export trade. The following sub-sections contain suggestions for producing a macro-economic climate which is conducive to the achievement of these aims.

11.5.2 Balance of payments. This is the highest priority, although it cannot be taken separately from the rest of the economy. The diversification of exports is essential, but it is hindered by a number of factors: Zambia's remoteness from large markets, its high relative costs, weakened manufacturing industry, and poorly developed agricultural base. Two policy measures could achieve the desired effect: firstly, an export subsidy for products in which the country is judged to have a comparative advantage; secondly, the structured devaluation of the kwacha. The second of these would not only make production for export a more attractive proposition for industry, but it would also discriminate in favour of those industries which did not have a high import component in their production costs.

The abolition of the controls on imports is not a realistic policy goal in the short to medium term, until one of the following has been realized: a substantial improvement in the terms of trade, a major devaluation of the kwacha, or an overhaul of the system of tariffs or other taxes on imports (e.g., sales tax) to penalize low priority imports, even more heavily than at present. Nevertheless import controls and other foreign currency restrictions can be applied more or less rigidly according to the priority of the industry involved.

In other areas of the external balance there is little scope for direct or immediate government action. Net services and unrequited transfers will be strongly negative for as long as

the country has a large external debt burden, and relies on expatriate workers to operate key installations in mining and manufacturing, while a net deficit on travel and transportation is almost inevitable given the country's landlocked position. The control of external borrowing, and an emphasis on concessional finance would help to lessen this burden, as will the Zambianisation programme lead to a gradual reduction in foreign workers' remittances. The capital account can be boosted by foreign borrowing, but in the medium to long term this merely adds to net current account outflows unless the loans are for quick yielding, foreign currency earning project. Direct foreign investment is unlikely to be attracted in sufficient volume to make a substantial impact until such time as the country's creditworthiness improves, and it is seen to be willing and able to allow the prompt remittance of current payments for goods and services and dividends.

Thus the elimination of the arrears on external payments is of the highest priority, and it would seem reasonable to expect that a major part of the proceeds of any new IMF facilities to be applied to this end. It is not suggested that the drawings be applied directly to reducing arrears; but money is fungible and the increased import capacity could be used to clear the arrears rather than increasing the volume of imports, or put more bluntly, to "pay for previous years' imports".

In several areas the question of exchange rate policy arises, as a means of making production for export more attractive

to enterprises, and as a disincentive to imports. The pitfalls have been referred to previously, the main drawbacks being the increase of inflationary pressures and the risk of "contractionary devaluation". Any use of exchange rate variations should be most judicious, but nevertheless it is felt that the Zambian authorities will have to take a more flexible stance on the exchange rate, allowing the possibility of more frequent adjustments, say semi-annually or annually, in order to reflect variations in the terms of trade, and other external developments. More frequent adjustments, or automatic adjustments in line with some set of indicators, are not advocated, since these would tend to diminish the role of the exchange rate as a positive policy instrument. A lower exchange rate would have other domestic effects: for instance, mining company profitability would be increased, allowing additional flows to the government budget. In general the exchange rate should be used as a long term policy tool, to promote desired structural adjustment, rather than as a short term "stabilization" measure to effect a sudden improvement in the external balance. The key word here is "gradualism", i.e., a planned devaluation of the kwacha, effected over some years.

11.5.3 External indebtedness. This study was commenced with the impression that Zambia had a serious "debt problem" and that this was a primary cause of the country's external payments difficulties. Chapter 9 concluded that Zambia was not among those countries which, historically speaking, had a "debt

problem", although it was becoming a high risk country. Undoubtedly the government needs to adopt some form of debt management policy in order to prevent the accumulation of an unserviceable debt burden. Firstly, an accurate and comprehensive debt information system should be established (see Appendix IX.3). There is no means at present of measuring debt outstanding, or the exact amount of debt service in any year. Secondly, the government should not merely monitor all new debt contracted, but should decide annually the level of new borrowing of given maturity periods (17) which would be permitted, having regard to medium term balance of payments projections, and the existing maturity structure of indebtedness. The elimination of the external payments arrears would also be a key element in debt management strategy.

11.5.4 The government budget. No detailed suggestions are made for fiscal policy, although various measures have been implicit in other proposals. For instance, a more active use of import tariffs was envisaged with respect to balance of payments stabilization. Discouraging capital intensive production techniques would be assisted by reducing or adjusting investment or depreciation allowances against company income tax. One of the problems noted in chapter 8 on the government budget was that instability in revenue receipts led to instability in expenditure patterns (more of a problem before 1975 than after). A detailed proposal is made in section 11.6 for reducing the effects of revenue instability.

The 1981 structural adjustment programme (section 11.4) contained the objective of raising the resources available for capital expenditure, and controlling the level of current spending. While not disagreeing with the intention of this aim, this emphasis of the distinction between capital and current expenditure can be counter-productive. A great part of current expenditure is development-oriented either directly or indirectly (e.g., education, agricultural extension services, and health care), while some capital expenditure may have no such value. Furthermore, capital expenditure almost invariably results in current expenditure after project completion. Thus a diminution of this distinction is urged. There is an institutional implication: until the end of the 1970s (18) the capital budget was allocated by the planning commission or ministry, while the current budget was allocated by the finance ministry, which also determined the overall size of the capital budget. Although there was an obvious overlap of interests, coordination between the two institutions was limited, and consequently there was no system for reconciling capital and current expenditure on any one project by the central authorities. Much greater coordination is therefore essential.

11.5.5 Money and credit. The assertion was made in chapter 8 that Zambian monetary policy was effectively passive, subject to the financing need of the government budget, and variations in net foreign assets. Attempts to control the size of the government deficit (or that part of it financed by the banking system) will help

to reduce monetary growth, as will balance of payments stabilization. But the evidence emerging from Appendix XI.1 and elsewhere in the study is that changes in the money supply provide a very poor explanation for either inflation or output. This has much to do with a decline in the velocity of circulation which cannot continue indefinitely. A more active monetary or credit control policy should only be adopted if evidence of causal linkages to price or output and their nature is established.

One area in which action should be pursued is a gradual increase in the interest rate structure until positive real rates are achieved. This would act to encourage savings, to discourage capital-intensive investment, and it would also reduce the attractiveness of borrowing on domestic money markets by companies which have the credit rating to borrow from abroad. The differential between the rate on treasury bills and longer term securities and loans should be narrowed and virtually eliminated, in order to reduce the attraction to the government of financing its deficit by treasury bills taken up by the Bank of Zambia.

11.5.6 Sectoral policy. Only limited attention has been paid to individual sectors in this study, and specific policy suggestions are accordingly few. The main area for action appears to be prices. The government frequently stated its intention to reduce or even abolish price control, but implementation was slow up to the end of 1979. There is an understandable fear of inflation caused by exploitation of supply shortages, and there is

certainly a good social case for controlling retail prices especially of imported consumer goods (until exchange rate or tariff measures are implemented), but in a manner which controls the trading margin and not the absolute price itself. The problem seems to lie, not so much in the machinery of price control, though this is cumbersome enough, but in the tendency to control prices for political purposes. Thus at times large numbers of items were referred to the Cabinet for approval of individual manufacturers' prices, causing long delays, and decisions were based not so much on economic (or even social) criteria as on political expediency. If the government wishes to influence manufacturers' prices, then it should do so through its representation on the enterprises' boards. There is no problem in principle in achieving consistency across enterprises, although some administrative effort might be necessary.

Allowing individual enterprises more freedom of action, including that of seeking credit from commercial banks, would help to enable many parastatals to become financially independent, and should stimulate industrial output. It is believed that similar action on prices would encourage agricultural output, as suggested in section 11.5 above.

Mining production cannot ever be expected to reach the levels once predicted (19) of 900,000 tonnes per annum or more, because of the very high cost of investing in new mine capacity. A more reasonable target would seem to be the restoration of past peak output of about 700,000 tonnes, an increase of over 100,000

tonnes from the 1980 level. To achieve this the mining industry might have to be given some priority in foreign exchange allocation, but it is unrealistic to expect even this limited increase, unless copper prices rise from the very low level seen in the early 1980s.

11.5.7 Economic planning. Comments were made in sections 11.4 and 11.5.1 about the difficulty of planning or forecasting in such an unstable economy as Zambia. Some form of planning is needed, but the present system of five year plans, with or without revision is anachronistic and should be abolished. Conclusions reached in an earlier study seem just as valid and are reproduced here:

"Firstly, there is a need for a more rational, consistent and coordinated approach to the preparation of plans, using some form of economic modelling.

Secondly, the practice of adopting rigid plans of fixed duration should be abandoned; it is suggested that "rolling plans" be adopted within the context of overall perspective

strategies. Thus, for instance, fairly detailed plans of three years' duration could be prepared, giving the overall guidelines provided by a ten, fifteen or twenty-year perspective strategy of broad policy objectives. The plans would be revised each year for a further three-year period taking cognisance of current trends, developments and problems." (Bell (1981b, p. 55)).

11.6 A development stabilization fund

One of the longest recognized effects of Zambia's economic concentration with respect to the mining industry, is the instability in the government budget discussed in chapter 8, and it was noted in section 11.5.4 that this was the cause of instability in expenditure, and this can lead to an unstable growth path. It has long been suggested, and the Third National Development Plan has now formally

proposed the adoption of a Development Stabilization Account, to which attention is now turned. Such a fund could have either or both of two broad functions:

- (i) to stabilize the availability of foreign exchange so as to ensure a steady volume of imports from year to year;
- (ii) to stabilize the government's flow of income and thus to achieve an orderly expenditure pattern, and consequently to promote more stable economic growth.

This section will examine only the latter type of fund, since it is felt that the initiation of both types of fund simultaneously would give rise to excessive administrative problems, and could cause unnecessary conflicts both in terms of policy formulation and practical implementation: One particular area of difficulty would follow from the different lag structures of changes in mineral taxation receipts and in export earnings with respect to fluctuations in mineral prices. The latter are influenced fairly immediately, a change in mineral prices taking only 2 or 3 months to work through into export earnings, while variations in mineral revenue receipts could be spread over 3 to 24 months depending on the type of tax in question, and the relationship between the companies' financial year and the tax year (20).

The very existence of these lags would help somewhat in enabling tax projections to be made rather more accurately than

export earnings estimates, a further reason for preferring a fund initially related to the government's accounts alone.

The fund is seen as a means of ensuring some stability for the main aggregates of government expenditure in an environment in which government income has shown wide variation almost entirely due to the volatility of mineral prices. As noted earlier in the paper, the capital budget has been the most seriously affected, since the major part of current expenditure is not amenable to significant variation. The uncertainty relating to capital spending has arguably seriously retarded Zambia's economic development.

In broad outline, the operation of the fund would firstly require the selection of a "time horizon" over which projections would be made. At present, accurate projections are made for only one year in advance, with more tentative projections being made in the context of each five year planning cycle. The latter are not updated annually. It would be necessary to prepare annual estimates over the selected time horizon. It is suggested that a three-year period is the minimum which would be of any use, and this would roughly coincide with the cyclical variations in copper prices which had occurred up to the early 1970's. Subsequent world economic problems have disrupted this pattern, and it is now difficult to predict probable cyclical movements. The three-year horizon also accords with the rolling plan concept proposed in section 11.5. Longer periods of, say, four or five years would perhaps enable more useful long-term expenditure planning to be undertaken, but

the prediction of annual fluctuations of copper prices would be rather more difficult in this context. Even longer horizons of seven or eight years would represent the upper limit within which acceptably accurate projections could be made.

Having decided the time horizon, projections would be made of the following principal aggregates:

- (i) recurrent expenditure;
- (ii) capital expenditure and net lending;
- (iii) recurrent non-mineral revenue;
- (iv) capital revenue - including if necessary an estimate of the acceptable level of short-term borrowing;
- (v) mineral revenue.

Projections would have to be in terms of expected future current prices, so that forecasts of inflation would have to be made over the planning period. The initial estimates of expenditure would no doubt be in excess of those actually possible within the projected resource constraints, and some form of iterative process reducing expenditure levels to accord with overall revenue projections would form part of the planning process. The exact mechanism for this is not explored here.

Rules must then be devised for governing the flow of resources into and out of the fund. It would be essential for these rules to have some legislative backing so as to avoid the non-economic pressures which are brought to bear on almost any finance ministry. The following rules are suggested as a possible basis for operating the fund:

- (i) all mineral revenue (including all tax receipts and dividends) would be paid into the fund either directly or as an automatic appropriation from General Revenue on the lines of the appropriations to Capital Fund up to 1972;
- (ii) withdrawals from the fund would be set by an appropriate authority at a maximum level concurrently with or before the preparation of each annual budget on the lines of (iii) below;
- (iii) withdrawals would be set equal to the least of the following magnitudes:
 - (a) the sum of the balance in the fund at the start of the base year and the estimated flow of mineral revenue over the time period (3, 5 or 8 years etc.) divided by the number of years;
 - (b) the arithmetic mean of projected overall deficits during the forecasting period;
 - (c) the arithmetic mean of capital expenditure during the forecasting period;
- (iv) if the projected withdrawal exceeded the opening balance in the fund plus the expected mineral revenue in the base year, then the maximum withdrawal permitted would be set equal to the latter amount; that is, the fund would not be allowed to lend to the government on the basis of anticipated mineral revenue.

Two further refinements might be made. Firstly, it is conceivable that long periods might occur when withdrawals might be considerably

less than actual mineral revenue. In such circumstances (say withdrawals are less than 75 per cent of actual mineral revenue, but there are large balances in the fund), an adjustment margin of up to, say, 10 per cent could be allowed, i.e., the withdrawal could be increased by up to 10 per cent over that given by the formula. Secondly, it would be possible to build in a discount rate to yield a net present value of planned expenditure and forecast revenue. In this case the government would have to decide on an appropriate discount rate, a policy which has not been adopted to date, even in the government's own project appraisal.

The rationale for each component of the proposed formula may be seen along the following lines:

- (a) withdrawals from the fund should not exceed the predicted medium-term trend of mineral revenue. In any given year they could differ from actual receipts for three reasons: if past mineral revenue had been high leading to substantial accumulation in the fund; if current prices are low but are expected to increase, withdrawals would be higher than current receipts; or if current prices are above those expected in future then accumulation of resources in the fund would take place;
- (b) there would be little justification in permitting withdrawals in excess of the gap between total planned expenditure and forecast non-mineral revenue receipts and net long-term borrowing. The only circumstance where such withdrawals might be contemplated would be

where the authorities wished to reduce the rate of increase of public debt accumulation. It is not thought likely that this would often be the effective constraint;

- (c) the use of the constraint on average planned capital expenditure is perhaps the most important. It is essential that capital expenditure, properly defined, should be stabilized. On the other hand, it is felt to be desirable that a long-term objective of the government should be to ensure that recurrent expenditure should be financed by non-mineral revenue. While the constraint as formulated here does not fully specify this particular objective, after some years it might be possible to amend the formula to formalize this aim when the government budget has developed to a point which permits this objective reasonably to be implemented (21).

The above formula may be presented algebraically as follows:

The proposed withdrawal, W_p , would be the least of:

$$(a) \quad \frac{1}{n} \left[SB_1 + \sum_t \left(\frac{M_t^*}{(1+d)^{t-1}} \right) \right]$$

$$(b) \quad \frac{1}{n} \left[\sum_t \left(\frac{E_t^*}{(1+d)^{t-1}} - \frac{RF_t^*}{(1+d)^{t-1}} \right) \right]$$

$$(c) \quad \frac{1}{n} \sum_t \left[\frac{K_t^*}{(1+d)^{t-1}} \right]$$

Then $W_a = W_p$ subject to:

$$(d) \quad \text{If } W_p \geq SB_1 + M_1^*$$

$$\text{then } W_a = SB_1 + M_1^*$$

$$(e) \quad \text{If } W_p \leq \alpha (M_1 + SB_1)^*$$

$$\text{then } W_a = (1 + \beta) W_p$$

where: W_a = actual maximum permitted withdrawal in a given year;

n = number of years in the forecasting period (i.e., the time horizon), $t = 1, 2, \dots, n$;

SB_1 = opening balance in the first year of the forecasting period;

M_t^* = projected mineral revenue in year t ;

E_t^* = projected total expenditure in year t ;

RF_t^* = projected non-mineral revenue and net long-term borrowing facilities (financing) anticipated in year t ;

K_t^* = projected capital expenditure in year t ;

d = discount rate;

α = cut-off proportion (projected withdrawal as ratio of opening balance and expected receipts) below which actual withdrawal may be increased;

β = maximum margin of adjustment permitted.

$$0 \leq \alpha, \beta \leq 1; \alpha \leq (1 - \beta).$$

A simulation of this model was conducted with a number of variations in the assumptions and parameters. The objectives were: firstly, to test the technical feasibility of operating the fund; and secondly, to examine the effects of such a fund on the short-term borrowing requirement during the period, in the context of the resulting overall financial position of the government. The model was tested on the hypothetical situation in which a stabilization fund was established in the early years of Independence.

Data limitations were such that the period 1966 to 1979 was used. The main difficulty with this approach was that the government has not, in the past, prepared annually long-term projections of revenue and expenditure aggregates. Estimates have been prepared at periodic intervals in the context of the development plans, but these have been too infrequent and have in any case proved to be highly unreliable. Alternative methods were used to attempt an approximation of the projections. The first, which in effect assumes perfect foresight, was to use the realized figures in lieu of projections. The second, again assuming considerable, though not perfect, fore-knowledge, used the estimates of revenue and

expenditure as contained in the annual budget. Both these methods imply much greater forecasting accuracy than could be achieved in practice, and the results of the exercise must be interpreted accordingly (22).

Using both sets of data, variations were made to the parameters as follows:

- (i) the time horizon was varied ranging from 2 to 5 years;
- (ii) selected discount rates within the range of 0 per cent to 20 per cent were used;
- (iii) the cut-off proportion, α , was varied within the range 0.75 to 1.0;
- (iv) the adjustment margin, β , was varied between 0 and 0.25.

Some fifty experiments were performed of which only a selected few, with the most extreme assumptions, are summarized here. The results of 16 such experiments are summarized in Tables 11.1 and 11.2 representing "actual" and "budget" data inputs respectively.

To test the effectiveness of the fund it was decided to examine the behaviour of the short-term borrowing requirement (STBR) with and without the existence of the fund. The STBR was chosen in preference to other components of the budget because of the arbitrary movements which occur from time to time in the individual items. For instance, capital expenditure and net lending have often been inflated by accounting entries whose complete elimination from the time series is problematic. The STBR is also suitable

because of its wider implications for macro-economic policies. A simple descriptive statistic which allows comparison of the relative dispersion of groups of data is the coefficient of variation (23). This coefficient should be lower if the fund is successful; in other words, the fund should reduce the variability of the STBR over a period of years.

An examination of the data in Tables 11.1 and 11.2 shows that in all cases the operation of the fund would have achieved some smoothing over the period 1966 - 1979 of the STBR, reducing the absolute size of both surpluses and deficits. The coefficient of variation was reduced substantially from 1.7 for the "actual" series to a level of between 0.8 and 1.3, depending on the assumptions used.

As tested by this statistic the fund is seen to be most successful in the following circumstances:

- (i) when the discount rate is high;
- (ii) when a longer time horizon is used;
- (iii) when "budget" data was used instead of "actual" data.

The use of discretionary adjustment (the parameter β) reduces only very slightly the "effectiveness" of the fund. It is therefore felt to be expedient to include such an adjustment in the formula. The effects noted in (i) and (ii) are not difficult to explain in view of the behaviour of the principal budgetary aggregates during the period studied, and the nature of the formula. In the years 1966-70, the determining criterion was the projected

level of capital expenditure. Discounting this flow would tend to reduce the withdrawal permitted as long as capital expenditure is increasing in current prices (as invariably it did). In subsequent years, the determining criterion became the projected levels of mineral revenue and fund balances at a time when mineral revenue was falling and deficits were widening. Again, the permitted withdrawal would tend to be decreased by such discounting. The use of a longer time horizon would naturally lead to greater smoothing, particularly in the situation studied, with two very distinct phases: 1965-70 characterized by high mineral revenue, and 1971-79 in which mineral revenue fell.

The apparently perverse effect obtained in (iii) in the preceding paragraph is largely due to the persistence of underestimating mineral revenue, most pronounced in the years when mineral revenue has been high. This tendency would cause the first criterion to become edominant and this in fact is what happened in the simulation. Thus if such a fund is established it is essential that projections should be more accurate, particularly those concerning mineral revenue. This paper does not attempt to suggest models for projecting copper prices, but many institutions do provide such projections including the World Bank's annual commodity price projections.

The results of the simulation exercise provide considerable encouragement for the long-term benefits of establishing a budget stabilization fund. There is little evidence that the inclusion of a discount rate would greatly improve the operation of the

Table 11.1 Effect of budget stabilization fund on short-term borrowing requirement:
simulation using actual data as proxy for forecasts

(Million kwacha)

	Actual	3 year horizon						5 year horizon					
		d=0.15			d=0.08			d=0.15			d=0		
		$\alpha=1$	$\beta=0$	$\alpha=0.6$	$\alpha=0.75$	$\beta=0.1$	$\beta=0.1$	$\alpha=1$	$\beta=0$	$\alpha=0.6$	$\alpha=0.75$	$\beta=0.2$	$\beta=0.1$
1965/1966	15.9	21.6	44.0	21.6	34.6	15.8	15.8	51.5	15.8	15.8	36.5	36.5	
1966/1967	-25.6	56.4	76.3	56.4	52.7	51.4	51.4	90.6	51.4	51.4	60.5	60.5	
1967/1968	10.9	20.2	40.0	20.2	16.1	21.3	21.3	58.1	21.3	21.3	29.0	29.0	
1969	-24.8	45.5	67.8	12.5	43.2	40.1	40.1	61.3	6.0	6.0	31.3	31.3	
1970	-67.4	18.4	38.1	-14.7	14.4	-20.8	-20.8	25.6	-53.5	-53.5	-11.6	-11.6	
1971	81.0	18.2	12.5	9.2	8.0	19.6	19.6	22.4	33.0	33.0	17.0	17.0	
1972	48.1	-85.9	-58.6	-67.3	-87.5	-38.9	-38.9	-50.8	-28.2	-28.2	-45.1	-45.1	
1973	96.8	40.5	-6.0	96.8	53.3	90.7	90.7	69.1	99.2	99.2	80.8	80.8	
1974	-142.4	61.6	38.7	34.1	50.1	108.0	108.0	80.3	97.9	97.9	95.9	95.9	
1975	265.4	233.5	215.1	226.3	228.9	251.9	251.9	227.9	247.9	247.9	243.2	243.2	
1976	194.9	145.7	132.9	147.4	145.5	140.2	140.2	124.2	138.5	138.5	136.2	136.2	
1977	247.4	205.6	197.2	210.7	207.6	167.7	167.7	165.2	164.0	164.0	170.3	170.3	
1978	309.0	268.6	266.3	271.7	272.0	219.0	219.0	225.6	229.8	229.8	225.6	225.6	
1979	75.0	34.2	19.8	59.1	45.3	18.1	18.1	-26.9	61.0	61.0	14.5	14.5	
Mean	77.4	77.4	77.4	77.4	77.4	77.4	77.4	80.3	77.4	77.4	77.4	77.4	
S.D.	133.4	98.8	92.3	100.1	99.3	88.9	88.9	82.7	91.0	91.0	87.2	87.2	
Coeff. of variation	1.723	1.276	1.192	1.293	1.282	1.148	1.148	1.030	1.175	1.175	1.126	1.126	

Source: Calculated from data in Appendix S, Table S.7.1.

(a) d = discount rate; α = "cut-off" point of proposed withdrawal as proportion of projected mineral revenue and available balance in fund at start of year; β = adjustment margin allowed.

(b) Positive (negative) signs indicate increase (decrease) in net borrowing.

(c) Mean = arithmetic mean; S.D. = standard deviation; Coeff. of variation = coefficient of variation = Standard deviation.

Mean

(d) The financial year July-June prevailed during the period 1965-67. The "year" 1967-68 is the 18-month period July 1967 to December 1968. The data were not adjusted in any way for this part of the exercise for the year 1967-68.

Table 11.2 Effect of budget stabilization fund on short-term borrowing requirement: simulation using budget data as proxy for forecasts

(Million kwacha)

	Actual	3 year horizon			5 year horizon		
		d=0 α=1 β=0	d=0.15 α=1 β=0	d=0 α=0.6 β=0.2	d=0.08 α=0.75 β=0.1	d=0.15 α=1 β=0	d=0 α=0.6 β=0.2	d=0.08 α=0.75 β=0.1
1966	15.8	16.4	38.9	16.4	29.5	25.8	41.4
1967	-25.6	66.5	77.4	66.5	72.8	64.5	70.1
1968	10.9	77.2	87.5	55.3	72.8	79.3	53.4
1969	-24.8	66.7	89.4	37.9	66.9	101.3	76.8
1970	-67.4	35.9	57.7	6.4	35.0	70.8	45.0
1971	81.0	55.4	70.4	27.4	51.0	31.6	10.3
1972	48.1	-31.2	-13.3	-58.2	-33.3	-16.0	42.1
1973	96.8	33.8	60.2	60.7	33.6	79.2	-42.2
1974	-142.4	53.2	37.3	67.4	39.7	70.1	82.6
1975	265.4	157.1	174.8	149.8	151.6	110.2	91.8
1976	194.9	108.7	103.8	129.8	103.6	206.1	189.2
1977	247.4	178.8	130.7	197.5	178.2	105.5	109.5
1978	309.0	256.2	227.3	270.3	259.3	130.3	147.8
1979	75.0	9.3	-13.0	56.9	23.5	201.0	211.6
Mean	77.4	77.4	80.6	77.4	77.4	85.9	77.4
S.D.	133.4	75.9	65.5	84.2	74.9	68.1	72.3
Coeff. of variation	1.723	0.9917	0.8125	1.088	0.9668	0.7925	0.9333

Notes and sources: See Table 11.1.

fund. Indeed, it was found that a high rate led to the accumulation of very large balances in the fund at various stages and caused considerable distortion to the STBR, occurrences which it is believed would not have been politically acceptable. In any event, the theoretical grounds for discounting the projections are not strong in the context of the fund, while the administrative complications which it would introduce would be substantial. The simpler model is therefore suggested, and the principal criteria would then appear as follows:

$$(a) \frac{1}{n} (SB_1 + \sum_t M_t^*)$$

$$(b) \frac{1}{n} \sum_t E_t^* - RF_t^*$$

$$(c) \frac{1}{n} \sum_t K_t^*$$

Although the proposed adjustment mechanism appears to make little difference to the results, it is suggested that this should be retained as a means for allowing some (albeit highly limited) discretion to the controllers of the fund.

The choice of a time horizon is largely a matter of judgement. Although the results for individual years showed some variation when different horizons were used, the overall effect was fairly similar in both cases. On balance, it is suggested that the longer horizon should be adopted since this would tend to diminish the consequence of a prolonged recession of mineral revenue such as occurred in the period 1975-79. The future pattern of mineral revenue receipts is

more likely to approximate to the experience of the 1970's (pre-dominantly low revenue with occasional surges) rather than that of the 1960's (consistenly high revenue). In such circumstances the longer horizon would be more appropriate. Tables 11.3 and 11.4 show the behaviour of all the principal aggregates, the criteria and movements of the fund for the two time horizons of 3 and 5 years, using the actual figures in lieu of projections. This enables an examination to be made of the operation of the fund over a number of years and various features may be noted:

- (i) in most years the adjustment mechanism came into operation, indicating that the formula gave a proposed withdrawal less than 75 per cent of the resources available to the fund;
- (ii) the years 1966-79 fell into three distinct periods: 1966-70 with the accumulation from high mineral revenue; 1970-73 decumulation as expected revenue fell; and 1974 onwards when the one year's mineral revenue created reserves which were gradually run down to zero by 1979;
- (iii) in almost every iteration the year-end balance in 1979 was zero indicating with virtual certainty that the fund would indeed have been exhausted by 1979. Given the probable slow build-up of mineral revenue in the next few years, it is felt to be extremely unlikely that the fund would see any actual accumulation for some time, even if it were established immediately (24);

Table 11.3 Government budget and the operation of the budget stabilization fund - 3 year horizon

(Million kwacha)

Year	Total expenditure, E*	Capital expenditure, K*	Revenue and financing, RP*	Mineral revenue, M*	Criterion 1	Criterion 2	Criterion 3	Opening balance SB	Fund Income	Withdrawal	Net change in fund	Closing balance
1966	187.1	58.1	75.3	141.5	187.8	201.3	135.7†	--	141.5	135.7	5.8	5.8
1967	438.4	157.9	170.6	245.7	220.9	220.5	163.7††	5.8	245.6	180.1	65.6	71.5
1968	404.7	191.0	180.4	176.2	244.6	196.0	166.9††	71.5	176.2	183.6	-7.4	64.0
1969	368.2	142.2	198.8	235.1	221.4	209.9	164.8††	64.0	235.1	181.3	53.8	117.9
1970	427.1	167.6	232.8	251.1	179.6	195.8	165.3††	117.9	251.1	181.8	69.3	187.1
1971	511.8	184.6	245.9	114.1	154.9††	206.6	239.3	187.1	114.1	170.4	-56.3	130.8
1972	472.2	143.7	345.1	55.7	211.9	189.7	234.6	130.8	55.7†	186.5	-130.8	--
1973	760.0	389.9	533.3	107.8	169.6	254.7	272.6	--†	107.8†	107.8	--	--
1974	576.1	170.3	360.7	341.5	137.5††	251.4	254.0	--	341.5	151.2	190.2	190.2
1975	804.4	257.5	482.3	59.4	86.7††	255.5	263.5	190.2	59.4	95.4	-36.0	154.3
1976	896.8	334.3	680.1	11.6	54.9††	244.5	284.5	154.3	11.6	60.4	-48.8	105.5
1977	793.9	198.6	566.2	-1.2	34.8††	221.3	214.3	105.5	-1.2	38.2	-39.4	66.1
1978	900.6	320.5	611.4	--	35.4††	203.7	211.9	66.1	--	38.9	-38.9	27.2
1979	849.4	123.9	702.4	40.0	64.7	179.0	178.4	27.2†	--†	27.2	-27.2	--
1980	1,029.6	191.3	854.6	127.0								
1981	1,180.0	220.0	965.0									

(a) Data used are "actual". See text and Tables 11.1 and 11.2.

(b) † indicates criterion determining withdrawal. †† indicates that the adjustment mechanism came into operation.

(c) Criterion 1: $\frac{1}{n} (SB_1 + \sum K_t^*)$

Criterion 2: $\frac{1}{n} (\sum E_t^* - RP_t^*)$

Criterion 3: $\frac{1}{n} \sum K_t^*$

Table 11.4 Government budget and the operation of the budget stabilization fund - 5 year horizon
(Million kwacha)

Year	Total expenditure, E*	Capital expenditure, K*	Revenue and financing, RP*	Mineral revenue, M*	Criterion 1	Criterion 2	Criterion 3	Opening balance SB	Fund income	Withdrawal	Net change in fund	Closing balance
1966	187.1	58.1	75.3	141.5	209.9	193.5	143.4	--†	141.5†	141.5	--	--
1967	438.4	157.9	170.6	245.7	204.4	224.3	168.7††	--	245.7	185.5	60.2	60.2
1968	404.7	191.0	180.4	176.2	178.5	196.2	165.8††	60.2	176.2	182.4	-6.2	54.0
1969	368.2	142.2	198.8	235.1	163.6††	196.7	205.6	54.0	235.1	179.9	55.2	109.2
1970	427.1	167.6	232.8	251.1	195.9††	205.9	211.2	109.2	251.1	215.5	35.6	144.8
1971	511.8	184.6	245.9	114.1	164.7††	231.4	229.2	144.8	114.1	181.1	-67.0	77.8
1972	472.2	143.7	345.1	55.7	130.8†	221.6	259.1	77.8	55.7	130.8	-75.1	3.7
1973	760.0	389.9	533.3	107.8	104.4†	241.7	270.1	2.7	107.8	104.4	3.4	6.2
1974	576.1	170.3	360.7	341.5	83.5††	234.2	256.2	6.2	341.5	91.8	249.7	255.8
1975	804.4	257.5	482.3	59.4	65.1††	240.5	247.0	255.8	59.4	71.6	-12.2	243.6
1976	896.8	334.3	680.1	11.6	58.8††	211.1	233.7	243.6	11.6	64.7	-53.1	190.5
1977	793.9	198.6	566.2	-1.2	71.3††	210.8	210.9	190.5	-1.2	78.4	-79.6	110.9
1978	900.6	320.5	611.4	--	82.8††	213.2	221.5	110.9	--	91.1	-91.1	19.9
1979	849.4	123.9	702.4	--	116.2	209.4	214.4	19.9†	--†	19.9	-19.9	--
1980	1,029.6	191.3	854.6	40.0	--	--	--	--	--	--	--	--
1981	1,180.0	220.0	965.0	127.0	--	--	--	--	--	--	--	--
1982	1,335.0	252.0	1,095.0	136.0	--	--	--	--	--	--	--	--
1983	1,485.0	285.0	1,215.0	258.0	--	--	--	--	--	--	--	--

(a) Data used are "actual". See text and Tables 11.1 and 11.2. Source: "Financial Reports", 1965 to 1979, Ministry of Finance; Annual Budget Address 1979 and 1980; author's estimates.

(b) † indicates criterion determining withdrawal. †† indicates that the adjustment mechanism came into operation.

(c) Criterion 1: $\frac{1}{n} (SB_1 + \sum M_t)$

Criterion 2: $\frac{1}{n} \sum (E_t - RP_t)$

Criterion 3: $\frac{1}{n} \sum K_t$

- (iv) the behaviour of the fund is highly sensitive to the projections input to the formula. If the "budget" rather than "actual" data projections are used, we find a more rapid accumulation of balances in the fund, and whereas the balances are reduced to zero in 1972 and 1973 in Tables 11.3 and 11.4, the alternative "projections" yield balances between K50 million and K150 million higher for the years 1968-77, again emphasizing the need for highly accurate projections;
- (v) the overall effect is undoubtedly a smoothing of the time path of STBR, with one or two apparent anomalies - mainly the creation in some years of additional borrowing requirements, an inevitable consequence of projecting beyond the peak of cycle into the subsequent trough as happened in 1974.

The last point raises two fundamental problems which must be examined before establishing any fund: firstly, is a positive short-term borrowing requirement compatible with large balances in the fund; and, secondly, in what financial instruments would the balances of the fund be invested?

At first sight it would appear somewhat contradictory for the government to need to borrow while it holds within one of its own funds amounts which could be more than enough to cover the requirement. However, it is suggested that there is no problem of principle in one government agency borrowing from another. This is a standard feature of government financing in the United

Kingdom where "the Departments", government agencies with temporary or permanent surpluses, take up government securities or Treasury Bills, usually on "tap" from the government broker. There would seem little reason why the necessary legislative arrangements could not be made in Zambia to permit "lending" by the fund to the general revenues of the Republic. Obviously such lending would not be at preferential rates, i.e., the government would pay interest at the standard rate.

The more difficult problem to resolve would be the type of investment which the fund could undertake. No true capital market exists in Zambia, since equity is held directly by private individuals, institutions, government and foreigners, and may not readily be traded. The fund's need would be for highly liquid assets which could be realized without loss at relatively short notice. It is hardly an exaggeration to say that such financial assets do not exist in Zambia at present. Financial intermediation is fairly rudimentary, being limited to the commercial banks, and an insurance company, a social security fund, and a building society each of which enjoy monopoly positions. Perhaps the most likely form of investment would be the extension of loans to these financial institutions and to such development oriented institutions as the Development Bank of Zambia and the new Agricultural Development Bank. Great care would have to be taken to ensure that the instruments issued by these institutions would not cause them liquidity problems when the government called in its loans, while from the government's

side the concern would be to find instruments of adequate liquidity for encashment at short notice. Direct investment in development projects would not be suitable.

This section has perhaps done little more than to demonstrate the feasibility of operating a budget stabilization fund (25), and the proposals discussed here may represent only the first approximation to a workable fund in one country. The concept of this fund might also be extended to a foreign reserve stabilization fund, in order to reduce annual fluctuations in the country's import capacity. One other such fund (for government revenue stabilization) has been found to exist, in Papua New Guinea (26), and it was established, subsequent to the formulation of these proposals, that the Papuan fund is similar in many respects (27). The main difference is in the use of exact formula to determine the size of withdrawals. It was established in 1975, and behaved in a manner rather similar to that simulated here, particularly in that initial accumulation in the fund, was followed by almost complete exhaustion of its resources by mid-1979 (28).

One way of overcoming the problem noted earlier, in which the operation of the formula leads to accumulation in the fund at the same time as the government is running a deficit, would be to invite foreign aid donors or financial institutions to finance the establishment of the fund - a "pump-priming" exercise. If this were undertaken by the industrial countries, the consumers of primary commodities, it would provide a feasible means of alleviating the effects on producers' economies of commodity price

instability, particularly if established so as to combine the objective of budgetary stabilization with that of reducing the variability of foreign exchange earnings. This would provide a possible alternative or supplement to international attempts to establish schemes for the stabilization of prices or export earnings.

11.7 Conclusion

Zambia's economic decline was precipitated by external factors. Given its dependence on copper mining it is most improbable that it could have avoided the consequences of the external shocks of the 1970s. To emphasize this point the extract from a recent World Bank study (29) quoted in section 11.5 is recalled: the conclusion was that two-thirds of the decline in output between 1974 and 1978 was unavoidable, even if Zambia had succeeded in diversifying its economy at a very rapid pace ever since independence in 1965.

If this is true, and if Zambia is not an isolated case, the contractionary short-term measures which many LDCs have to adopt (as an alternative to adequate external assistance) in countering their balance of payments problems represent a means by which the burden of adjusting the global economy is transferred to the poorer countries. In the end the issue is extraordinarily simple: if a country's capacity to import declines because of a prolonged fall in its export earnings, then it must reduce its imports by restricting domestic demand. Unless countries with equivalent external surpluses expand their economies at the

same time, and so increase their demand for imports, world trade is retarded and global economic growth falls. The IMF appears to act as an unwitting catalyst in this process: it can insist on deflationary policies in deficit countries because they need its resources, but it cannot enforce reflation of surplus economies which, by definition, do not require additional external loans or capital inflows. In this way, the effect of the Fund is asymmetric and contractionary. Unless heed is paid to pleas such as those of the "Brandt Commission" (30) for large increases in the financial resources available to developing countries, and unless there is a conscious attempt to raise national growth rates in the more robust economies, even at the cost of an increment to their inflation, then the instability in the world economy can only increase, particularly if current trends towards protectionism continue.

The conclusions reached here should not be taken to absolve Zambia's political leaders and economic administrators from responsibility for the current state of the economy. Rather the analysis should serve to increase their resolve to undertake the necessary adjustments, so that any further deterioration in external conditions does not automatically cause decline in the domestic economy.

Since the major part of this thesis was written it has become clear that the economy has suffered further setbacks. No data has yet been published, but the continued depression of copper prices throughout the period 1980 to 1982 placed intense pressure on the

balance of payments, the government budget and the finances of the mining companies; the problems identified in this thesis have thus become more acute. Zambia's failure or inability to meet the conditions of the Extended Facility negotiated with the IMF in 1981 led to the suspension and eventual cancellation of the programme in July 1982. Without such finance there is very little hope of stabilizing the balance of payments. Indeed in early 1983 Zambia announced that it was suspending payments of principal to certain external creditors and was seeking formal negotiations leading to the rescheduling of its external debt. This followed a period during 1982 when it appears that Zambia may have technically defaulted on some payments of both principal and interest. Thus, the situation has deteriorated to the extent that the authorities were forced into actions - default and rescheduling - which it had been their strongest wish to avoid.

A pessimistic conclusion is almost inevitable. Global economic recovery seems remote, so copper prices are unlikely to rise in the foreseeable future. The country cannot rely on external assistance indefinitely unless a major change occurs in attitudes among the industrial donor countries to permit a very much larger transfer of resources. The more fundamental change would be for those countries to accept price stabilization measures, which in the case of copper would have to be preceded by an initial increase in its price.

Notes

1. The four groups were: "Semi-industrial", "primary producing", "populous South Asia", "Least Developed". Zambia is included in the second group. The countries covered exclude oil-exporters.
2. It was found that the export prices of these countries rose significantly more rapidly than world prices. This is almost certainly a consequence of the rise in prices of some agricultural commodities (cocoa, coffee, etc.) during the period under review (1974-78) .
3. Caused either by a decline in demand for the product or domestic supply problems.
4. Kenya, Tanzania, Senegal, Sudan.
5. It has been variously suggested that one reason for the monetary approach to the balance of payments becoming so widespread is that monetary data is generally far more up-to-date than other economic variables (such as the national accounts, and so provides a much quicker means of monitoring and forecasting developments in the economy (e.g., see Furness (1975, p. 214) and Killick (1981a, p. 51)).
6. The Executive Board consists of 21 Executive Directors appointed or elected by member countries on the basis of quotas (or financial contribution).
7. Input-output analysis has been widely documented, e.g., see Dorfman, Samuelson, and Solow (1958), and Hadley (1962), Blitzer, Clark and Taylor (1975), Taylor (1979).
8. Stone has developed a method of updating which requires knowledge (or an estimate) of the total intermediate demands and outputs of each sector, i.e., the row and column totals of the matrix of interindustry flows. It is known as the RAS method and is outlined in Bacharach (1970).
9. It is noted in section 11.5 that planning is very severely deficient in many respects, one of which is the overall consistency of the projections in the national development plans.
10. For instance in 1973 real value added in running fell by 3 per cent, while in current prices it rose by 59 per cent. In 1975 the real value added fell by 10 per cent, with the current price figure falling by 65 per cent.

11. See Johnston (1972).
12. Appendix S Table 5.6.3 contains details of drawings. Section 9.7 reviews the financial implications of past and expected future drawings. Appendix IX.4 is a glossary of technical terms relating to the IMF.
13. The 1978 programme is reported in IMF Press Release 78/26 of 26 April 1978, reported in IMF Survey (8 May 1978, page 142). The 1981 programme is reported in Press Release 81/36 of 11 May 1981, reported in IMF Survey (18 May 1981, page 157). The 1978 IMF package was announced to the Zambian public in a statement by the Minister of Finance, J. M. Mwanakatwe, to the National Assembly on 17 March 1978, reproduced in the Zambia Daily Mail (18 March 1978).
14. Every attempt has been made to preserve the principle of confidentiality between the Fund and its members. Only published material has been used, although a reasonable appreciation of the impact of the programmes can only be gained through examination of the details of the performance criteria.
15. The Third National Development Plan does envisage an annual updating process. No information was available at the time of writing on the effectiveness of this procedure.
16. "Indicative" planning is that which attempts to control economic activity by indirect means - incentives, exhortation, etc., rather than by central direction of resources.
17. Possible divisions of maturity might be "less than 12 months", "1 to 5 years", "5 to 15 years", "15 years and over".
18. There is no indication that the system changed subsequently.
19. See chapter 6, section 6.5.
20. Mineral tax is paid on the basis of self-assessment in monthly instalments with a lag of 6-8 weeks with any necessary adjustment at the year-end. Company income tax is assessed during a given tax year on the basis of earnings in the company's financial year which ended in the previous tax year. Thus, for example, until 1980 RCM's earnings in a given financial year (July to June) would not be assessed for income tax until the following March with payment due in the following August. The tax and financial years have subsequently been synchronized.

21. At no time since Independence has non-mineral revenue been sufficient to finance recurrent expenditure, and it is unlikely to be achieved in the near future. Nevertheless it remains a useful long-term objective.
22. Neither alternative provided projections (at the time the calculations were performed) for the periods 1980-81 and 1980-83 for the 3 and 5 year horizons respectively required to simulate operation of the fund up to 1979. The following methods were adopted:
 - (i) 1979 and 1980 projections are those contained in the pertinent Budget Speeches;
 - (ii) subsequent years were projected as follows (all figures approximate only):
 - (a) recurrent expenditure was assumed to grow in real terms by 4 per cent in 1981 and 3 per cent in 1982 and 1983;
 - (b) capital expenditure was assumed to grow at 4 per cent per annum in real terms;
 - (c) recurrent revenue was assumed to grow by 3 per cent per annum in real terms.
 - (iii) to convert projections to current price estimates inflation rates were assumed of 10 per cent in 1981 and 1982 and 8 per cent in 1983;
 - (iv) Mineral revenue estimates were prepared on the basis of annual copper production of 700,000 tonnes; cobalt production of 3,000 tonnes in 1980 and 1981, and 5,000 tonnes in 1982 and 1983; a static current price for cobalt of K45,000 per tonne; copper prices of K1,500, K1,600 and K2,000 per tonne in 1981, 1982 and 1983; unit production of lead and zinc. The fairly optimistic assumptions were deliberately chosen to demonstrate the effect on the fund of a surge in mineral revenue.
23. The coefficient of variation is defined as the standard deviation divided by the mean of the given data. None of the other indices of instability discussed in Chapter 4 are appropriate since they measure deviations from trends of time series. Since the STBR is a residual derived from several series it cannot be treated independently as a time series. Moreover, indices using exponential trends would encounter problems with negative values (logarithms non-existent).

24. Simulations using updated information (out-turn for 1979 and 1980, revised budget estimates in 1981 and initial estimates in 1982) were prepared and presented in Bell (1983). The conclusions were very similar to those reported here, especially in that the fund would have been almost exhausted by the end of the period under review.
25. The operation of the fund was simulated as one of the experiments with the model contained in Appendix XI.1. As with other experiments the effects on output were not significant but some success was achieved in slowing the trend growth of money supply and in reducing banking system claims on the government.
26. See Papua New Guinea (1974).
27. Withdrawals from the Papuan fund are determined so as to approximate even flows from the mining industry direct to the government budget over a five year horizon. Projections of resources are prepared on the basis of projected trends of the copper price. Here the Papuan fund is specific in laying down the method of forecasting (it is related to the trend over the previous 20 years). Active horizon is eight years, rather longer than proposed here.
28. See Papua New Guinea (1979b).
29. World Bank (1979, p. 79).
30. Independent Commission on International Development Issues (1980).