FINANCIAL LIBERALISATION AND ITS IMPACT ON SAVINGS MOBILISATION AND INVESTMENT: A CASE OF ZAMBIA

BY

JUDITH C. MAKULU KUMWENDA

UNZA

THE UNIVERSITY OF ZAMBIA

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

ECONOMICS DEPARTMENT

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APPROVAL

This dissertation of Judith C. Makulu Kumwenda is approved as fulfilling the requirements for the award of the degree of Master of Arts in Economics of the University of Zambia.

Prof. M. A. Hyuha (External Examiner)	..... Signature	..... Date
Dr. I. Mwanawina (Internal Examiner)	..... Signature	30.12.03 ..... Date
Dr. L. Mwansa (Supervisor)	..... Signature	30/12/2003 ..... Date

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udith Chimfwembe Makulu Kumwenda
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Judith Chimfwembe Makulu Kumwenda
University of Zambia
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DEDICATION

To the memory of my mother Rita Kabungo Makulu, my young sister Maggie Makulu Namoonde and my nephew,
Edgar Fudzai Mhende, who could not wait any longer.

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ABSTRACT

This study considers the impact of financial liberalisation policy on savings and investment in Zambia for the period 1964 to 1996. It examines the relationship between positive real domestic interest rates and savings and investment. Real domestic interest rates are a proxy for financial liberalisation. Other variables of interest were included. These were world real rate of interest, credit availability, real exchange rate, domestic credit to the government, terms of trade, foreign debt growth rates and foreign direct investment.

The study uses econometric time series analysis, consisting of cointegration analysis and error correction models on annual data.

The main findings are that positive real interest rates have no long run relationship with savings and do not affect savings in the short run. The variables that have an impact on savings in the long run are foreign debt and the world real interest rate. In the short run the growth rate of income and world real rate of interest and foreign direct investment affect savings. The study has therefore, not found any support for the McKinnon-Shaw financial repression hypothesis for the savings model.

In terms of investment, for the long run, credit availability has been found to exert a strong influence, as well as, foreign debt, terms of trade and the world real rate of interest. In the short run the real exchange rate and real domestic interest rate are the only two variables to exert any significant impact. The two dummies for change of policy and openness of trade have not had any impact on savings or investment. The study concludes that for investment, the McKinnon-Shaw hypothesis has found empirical support. Results have validated the theory that it is via the availability of credit, rather than through positive real interest rates per se, that investment is increased.

It is recommended that macroeconomic stability should be a precondition for successful financial liberalisation. Exchange control regulation needs to be put in place to prevent or at least limit capital flight. There is need to reduce reserve requirements to free up loanable funds so as to increase credit that can go to finance productive investment. To promote investment especially in non-traditional exports there is need to make the prices of domestic exports attractive to the world market

CHAPTER ONE

INTRODUCTION

1.0 **BACKGROUND**

Zambia has recently put in place a policy of financial liberalisation as part of the financial sector reform package. The financial liberalisation policy has been necessitated by the urgent need to redress the country's economic problems. In the past, the Zambian economy was characterised by a system of regulation and controls on prices, interest rates and exchange rates. A policy of directed credit was seen as necessary to bring about development in priority sectors as well as those that were deemed socially disadvantaged or vulnerable. Ceilings on interest rates, poor savings mobilisation, a low supply of loanable funds and a lack of investment typified the economy. The securities market was limited to a very narrow range made up mostly of government securities and bonds. Trade policy involved import substitution rather than export promotion and it relied on a strategy of heavy protectionism. This led to large balance of payments deficits, high inflation, a rising foreign debt and, generally, an unstable macroeconomics environment, which is inimical to sustainable long-term economic growth.

Financial sector reform is an integral part of the Structural Adjustment Programme (SAP) that was put in place in 1992. Its main focus is financial liberalisation policy that emphasises the deregulation of the financial sector by the removal of interest rate ceilings

and the raising of institutional interest rates. Financial liberalisation policy, the theoretical underpinnings of which were formulated by McKinnon (1973) and Shaw (1973), has held sway with the IMF and the World Bank since the 1970s as a macroeconomic policy prescription for countries undertaking SAP. According to McKinnon and Shaw a financial system typified by government intervention and bank regulation is evidence of financial repression. Other characteristics of a financially repressed economy are poor savings mobilisation, lack of credit and low investment. Low deposit interest rates cause a disincentive to save, while excessively high nominal lending interest rates lead to an undue disincentive to invest. This state of affairs is symptomatic of a financially repressed economy. McKinnon and Shaw therefore define financial repression as artificially low deposit and loan rates that give rise to excess demand for loans and to non-price credit rationing (McKinnon, 1973).

The remedy, the financial liberalisation theorists posit, is to liberalise interest rates by allowing them to attain their free market equilibrium levels to enable the effective mobilisation of savings and the allocation of the increased quantity of credit to finance productive investment.

1.1 **RESEARCH ISSUES**

Zambia's economy in the years 1964-1991 was generally financially repressed, as typified by negative real interest rates. The returns to depositors were low, with poor savings mobilisation and a low supply of credit and investment. Interest rate ceilings were kept artificially low to make the cost of borrowed funds cheap. The system of directed credit ensured that only the government had access to this readily available source of

funding for itself and the fast growing parastatal sector. Selective credit policies led to the funding of projects that had political and social benefits; the profit motive was not the main consideration. Cheap credit led to the funding of investments that were unnecessarily capital-intensive as evidenced by the nature of the parastatal sector in Zambia. Investment inefficiency was a consequence of the system of cheap credit.

In October 1991, a new government came into power and ushered in a policy of financial liberalisation to make the financial sector more market-oriented and development driven. The interest rates and exchange rates were now to be determined by demand and supply forces. The financial repression era of 1964-1990 and its system of administratively set interest rates, exchange rates and price controls was abolished.

The argument for and against financial liberalisation is still unsettled with strong empirical evidence to support both sides, underpinning the need for country-specific studies. There is therefore need to study Zambia's experience with financial repression and financial liberalisation with the purpose of establishing whether financial liberalisation has had a positive impact on savings and investment in Zambia.

There are three main issues that the study seeks to address. The first issue is that of interest rates, with positive real interest rates generally taken as evidence of financial liberalisation. Real interest rates and their effect on savings and investment have been the subject of much debate though the effect of high institutional interest rates on savings rates has empirically been found to be ambiguous. Empirically, it is an established fact

that real interest rates do however, affect the form of savings. As far as investment in Zambia is concerned, the high market-determined interest rates on the newly introduced Treasury Bills of 1993, resulted in a large portfolio shift from savings deposits, probably affecting the availability of funds for on-lending by commercial banks. This substitution into Treasury Bills may have resulted in a decrease in investment as well as savings. The demand for credit for investment purposes especially in the early 1990s might have been affected by these high nominal interest rates. If this was the case, problems of moral hazard and adverse selection may have resulted because only the distress borrowers would be interested in obtaining credit at these high rates of interest. There is need to establish empirically the impact of real interest rates on savings and investment.

The second issue to be addressed is whether macroeconomic factors could also have affected savings and investment in Zambia. Output growth rates, external indebtedness, foreign direct investment and the exchange rate are some of the other issues that could play a significant role in the outcome of financial liberalisation policy in Zambia.

Thirdly, there are various factors that can hinder or affect the outcome of financial liberalisation policy in Zambia. The trade embargo of the mid-1960s to late 1980s with countries in Southern Africa had a negative impact on the economy in that importation of capital equipment and machinery from alternative sources pushed costs upwards. Freeing of such restrictions is expected to have had a positive impact on trade. Would it also have a similar effect on savings and investment? These are the issues that the study seeks to address.

1.2 **OBJECTIVES**

The study aims at analysing the impact of financial liberalisation on savings mobilisation and investment in Zambia.

The objectives of the study are specifically:

- To carry out a comparative analysis of the nature and trends in the behaviour of savings and investment during the period of financial repression and financial liberalisation.

- To identify the impact of financial policy on savings mobilisation and in particular to determine whether financial liberalisation has led to increased savings.

- To identify the impact of financial policy on investment and to determine whether financial liberalisation has led to increased investment.

- Depending on the findings of the study, to offer policy recommendations relating to the successful implementation and operation of financial liberalisation policies in the Zambian economy.

1.3 MAIN HYPOTHESES

There are two main hypotheses to be tested, namely:

1. Financial liberalization, as evidenced by positive real interest rates, has led to greater national savings mobilisation in Zambia.
2. Financial liberalization, as evidenced by positive real interest rates, has led to increased investment in Zambia.

1.4 RATIONALE

There is a lack of empirical studies, particularly country-specific investigations on the outcome of financial policy in African countries including Zambia, especially as it relates to the issues of savings mobilisation and investment . As such this study will fill the gap in this area, as it will be among the few that have looked at financial policy performance.

The study will contribute to the body of knowledge by providing empirical evidence of Zambia's experiences with financial liberalisation.

1.5 ORGANISATION OF THE STUDY

The rest of the study is structured as follows: the next chapter gives a brief overview of the Zambian economy and highlights the performance of interest rates, savings and investment since independence. Chapter Three provides a review of the theoretical and empirical literature. In Chapter Four a presentation of the methodology is made, while

the results are analysed in Chapter Five. The final chapter presents the conclusions and policy recommendations.

CHAPTER TWO

THE ZAMBIAN ECONOMY

2.0 **INTRODUCTION**

The purpose of the review of the Zambian economy and the financial sector is to shed light on nature of the financial system. The chapter covers the evolution of the financial sector from the time of independence in 1964 and up to 1996. The review is divided into five main identifiable periods in Zambia's financial sector history and also gives a brief overview of the trends in interest rates, and the resultant effect on savings and investment. The rest of the chapter is organised as follows: Section 2.1 covers the financial system from the pre-independence era to the 1991. The Section 2.2 reviews the period from 1992-1996, while the last section, Section 2.3 reviews the performance of savings, investment and interest rates. The chapter ends with a summary in Section 2.4.

2.1 **AN OVERVIEW OF THE ZAMBIAN ECONOMY: PRE-INDEPENDENCE TO 1991**

2.1.1 **Origins**

The financial system Zambia inherited at independence in 1964 was made up of mainly foreign-owned commercial banks. These were in the business of providing short-term commercial and trade credit. Though there was financial stability, the system was stagnant and was geared towards the support of Zambia's dual economy, which relied

heavily on revenues from copper exports and agricultural production. It catered mostly for mining and farming communities with hardly any services being offered to the indigenous populace. The banks were concentrated along the railway line where the expatriates were settled, more especially on the Copperbelt, the heart of Zambia's industry, and in Chipata where there was a small settler community. This bank branching system reflected the demand-following strategy that was so typical of the English banking system on which most of the colonial banks were based (Musokotwane, 1984). The little savings of the indigenous population were hoarded and as such it was saving denied to productive investment. A currency board played the role of the Central Bank for the three countries of the federation.[1] It regulated money supply *and maintained reserves that were invested abroad.*

The financial system comprised the currency board, a few banks, post office savings banks, cooperative societies and indigenous moneylenders. The commercial banks included Standard Chartered Bank and Barclays Bank that had British parentage and Grindlays Bank, which had headquarter in New Zealand. The Agricultural and Land Bank was the only specialized institution in which the colonial government had majority interest. It was set up to provide investment credit to farmers because the commercial banks were reluctant to accommodate them.

Credit societies were later established from farmers' membership contributions and were localised in their operations. Their objective was the provision of an alternative

[1] The three countries were Nyasaland, Northern Rhodesia and Southern Rhodesia

source of funding for the farmers. Indigenous farmers were not accommodated by these institutions since they could not come up with the required collateral in the form of title deeds (Mwenda, 1993). As a result, they were forced to rely on the curb market for the financing of their working capital requirements. Moneylenders, friends and relatives supplied curb market loans under the "chilimba or kaloba" [2]system.

2.1.2 **Post-independence era-strategies for development**

The new government embarked upon the First National Development Plan in 1966. The goal of this plan was to set conditions for dynamic and sustained growth. One of the strategies adopted was to make rural credit and investment funds available. The financial system was remodeled to be more development driven. The Bank of Zambia (BOZ) was established via the Bank of Zambia Act of 1964. Its main functions were the general banking services to the government and the commercial banks, the supply of currency and management of foreign exchange reserves and the conduct of monetary policy (Musokotwane, 1995). In those days the question of price stability did not arise. The bank could use statutory and liquidity ratios to achieve the appropriate monetary conditions. The Act imposed ceilings on the extent to which government could borrow from the central bank to finance fiscal imbalances. The ceilings were never adhered to, however, and the government itself borrowed both at home and abroad to finance government budget deficits and the setting up of state-owned enterprises.

[2] The indigenous financial system in the form of rotating savings and credit associations

New financial institutions were created after independence to provide funds for development at low interest rates to those sectors that were considered to be at the forefront of industrial development. Under this development strategy, the first bank to be incorporated was the Commercial Bank in 1965. It was privately owned by a consortium of companies and was the result of a takeover of the Netherlands Bank of South Africa. In 1969, the National Commercial Bank (NCB) was set up by the government, which held a 99% equity interest. The rest of the shares were distributed among indigenous companies and individuals. By 1970 there was a total of 5 banks in operation. Despite the increase in competition, the use of traditional instruments of savings mobilisation and credit allocation persisted. There were short to long term funds available with short-term funds being the most common. Longer-term loans were issued for very special cases and to preferred customers. The government regulated the financial sector by putting in place lending and deposit interest rate ceilings with the purpose of making loans affordable especially to emergent farmers. This failed to reverse the bias against agriculture.

The Agricultural Finance Corporation, (AFC), was set up to replace the Credit Organization of Zambia, (COZ), that had been established in 1965 with the sole purpose of supplying credit to indigenous farmers on liberal terms. However COZ had become insolvent. The newly established AFC was given the mandate to operate on economic lines with a profit motive.

During the first decade after independence Zambia enjoyed relative economic prosperity. High copper prices led to increased export revenues and the positive balance of payments position for the years 1964-1974, showed a current account surplus of US$49.6 million, representing 3.8% of Gross Domestic Product (GDP). The external debt outstanding for this period was US$1.0 billion, about 37.3% of GDP. The inflation rate was quite low at 7.7 %. (see Table 2.1) Inflation rose in the late 1960s as fuel and transport costs for imports shot up with the Unilateral Declaration of Independence by Southern Rhodesia in 1965. Other factors that contributed to this upward trend were an increase in money supply and the rise in the public service wage bill.

It appeared that Zambia's programmes for development were working as the economic statistics compared favourably with those of other countries in Sub-Saharan Africa. Copper prices were rising and reached a peak in 1974. The high prices combined with increased copper output to give Zambia high revenues. At this time the mines enjoyed levels of investment in plant and machinery that have not been matched since.

In April 1968, the government ushered in the Mulungushi Economic Reforms with the objective of gaining control of the important sectors of the economy. The Mulungushi Declaration requested private companies to surrender to the state 51% controlling share in major non-mining enterprises. Repatriation of profits was limited, the access to bank credit of non-Zambians was restricted and non-Zambians, especially Asians, were forced out of the retail and petty trading sectors to make room for Zambian co-operatives and individual enterprises. This effectively began the years of state

participation in industry. The Zambia Industrial and Mining Corporation (ZIMCO) and its subsidiaries, the State Finance and Development Corporation (FINDECO) and Industrial Development Corporation (INDECO), were formed to look after the government interests in industry and to control banks, insurance and building societies. The following year, the government nationalised the copper mining companies through the Matero Reforms. The government also enacted an amendment to the already existing law in 1971 making it mandatory for all foreign owned banks to be incorporated in Zambia and to appoint Zambians to key managerial positions. These nationalistic policies were the prelude to economic crises in the next decade.

2.1.3 **The crisis years: 1973-1980**

The oil crisis of 1973 and the ensuing worldwide recession had a detrimental impact on Zambia's economy. Copper prices dropped to an all-time low and soon production levels started to decline. The government reacted by imposing credit controls with the aim of containing monetary expansion without having to raise interest rates. The imposition of controls on interest rates and the fixed exchange rate combined with prevailing low inflation to make capital cheap and underpriced the foreign exchange.

Zambia's economy was adversely affected by the oil crisis. Also, copper prices on the world market collapsed. The huge oil import bill combined with the fall in copper revenues to move the Balance of Payments position to a deficit that averaged US$396.1 million for the period 1975-82. Similarly, the levels of external borrowing for this period shot up and resulted in a national debt of US$3.1 billion, which was 82% of

GDP. The growth rate of GDP began to show a declining trend, as scarcity of foreign exchange became a reality. Investment in the mining sector declined as a consequence of this shortage of foreign exchange earnings. The growth rates of investment and savings were now negative and their shares of GDP fell to 21.9% and 18.7% respectively. The inflation rate increased and reached an all-time peak of 19.8% in 1977.

The financial system in Zambia became increasingly regulated and repressed as the government strengthened its direct involvement in banking. In 1975 the government acquired a 60% controlling interest in the Commercial Bank and merged it with the NCB to form the Zambia National Commercial Bank. The government's objective was to increase its interest and control of the financial system. The new bank began a programme of provision of banking services to all parts of the country via an extensive branching network. The Development Bank of Zambia (DBZ) was also established in 1975 as a jointly owned entity by the government and private European interests. The role of DBZ was to provide investment loans. It mobilized resources by the issue of equity and by borrowing both locally and internationally, with the government guaranteeing its loans.

The macroeconomic situation deteriorated and in March 1978 a two-year stabilisation programme was agreed upon with the IMF under which restrictive monetary and credit policies were put in place. Measures taken ranged from the elimination of controls on credit, interest rates and foreign exchange to the removal of restrictions on the

activities of institutions and introduction of new financial instruments. More important however were agreements for the scheduling of external debt payments and the reduction of arrears, as well as the realignment of the exchange rate. The stabilisation programme did not yield any positive results as the economy continued to deteriorate.

2.1.4 **The crisis years: 1981 – 1990, and Structural Adjustment**

Zambia's economy was further affected by the second oil shock of the 1980s. The deteriorating economic situation led to balance of payments problems and inability to service the external debt which averaged US$6.5 billion for the period 1981-1990, or 10% of GDP. Inflation continued to rise and reached 57.4 %. This forced Zambia to turn to outside sources and in 1983 a three-year (1983-1985) IMF/World Bank Structural Adjustment Programme (SAP) was adopted. The SAP recognised that structural problems in Least Developing Countries (LDCs) and exogenous factors such as worsening commodity prices were the root cause of LDCs poor economic performance.

Table 2.1 Zambia's Macroeconomic Performance Indicators

Period	1964-74	1975-82	1983-90	1991-96
Current Account Surplus \(deficit) US$ (mln)	49.6	(396.1)	(256.2)	(159.3)
% of GDP	3.8	(12.4)	(10.2)	(3.6)
External Debt Outstanding US$ (mln)	1.0	3.7	6.5	6.6
% of GDP	37.3	82.0	215.1	162.7
Real GDP growth rate (%):	2.7	0.8	0.4	-0.24
Investment as % of GDP	27.0	21.9	10.9	13.40
Real growth rate of investment %	8.1	-3.1	-8.7	-4.4
National savings as % of GDP	42.0	18.7	20.3	5.2
Real growth rate of savings	5.1	-5.5	29.2	-0.30

Real exchange rate	1.81	1.60	4.03	3.05
Inflation rate (%)	7.7	14.0	57.4	102.2

Note: Sources Mwenda, 1994 and IFS 1997

Under the SAP's liberalisation policy, the government was to reduce demand through the removal of subsidies, decontrol of prices and devaluation of the currency by 20%. The level of imports was to be drastically cut to bring it in line with the new level of reduced foreign exchange earnings. Interest rates were to be decontrolled.

Above all, debt servicing was to be prompt hence the necessity of reduced domestic consumption to leave a surplus for debt service. Foreign exchange was to be allocated through the Dutch Auction[3] that was initiated in October 1985.

However the SAP of 1983-85 did not achieve its purpose as the economy deteriorated even further. The programme was undermined by shortfalls in copper exports and a rapid acceleration in money supply growth due to fiscal indiscipline. Inflation in the mid 1980s stood at 60% and foreign exchange reserves fell sharply. By May 1987 after disagreements over the timing and achievements of the SAP, the government broke off relations with the IMF/World Bank and announced its own home made New Economic Recovery Programme (NERP) under the theme 'Growth from Our Own Resources'. The NERP maintained some of the features of SAP, though one significant departure from this was the reduction in the rate of debt service to 10% of net export earnings. Government intervention or control was reimposed in foreign exchange determination

[3] A Dutch Auction is a mechanism for selling foreign exchange in which the price is reduced by the auctioneer until a buyer is found.

and foreign exchange allocation. The Kwacha was now pegged at a fixed exchange rate to the United States dollar and allocation was achieved via the Foreign Exchange Management Committee, (FEMAC). In 1988 the government devalued the Kwacha by 25%. The government also intervened in interest rate determination but promptly revised the rate upwards. Price control mechanisms were reintroduced for essential commodities.

In the deregulation years of 1985- 87, interest rate ceilings were made more flexible. Regular and sizable adjustments were made to interest rates corresponding to changing inflationary conditions. This period saw the proliferation of commercial banks, both local and foreign. This influx was due to the high profits the industry was reaping and to the low level of equity capital required by the law to start up a bank. About K2 million was the amount required as initial equity capital by law. The increased number of commercial banks brought in a lot of competition and resulted in innovations in the type of instruments being offered. For instance financial instruments of differing maturities and leasing arrangements were brought on to the market to mobilise and allocate financial resources effectively.

During the early 1980s real GDP posted a negative growth rate. From 1985 to 1988 however there was a marked upward swing as the rate climbed and reached a high of 6.3% in 1988. This performance is attributed to the recovery of copper prices and increased output, combined with a reduction in world oil prices and a significant increase in agricultural output.

The NERP however lacked donor support and owing to the now slow pace of debt service, many donors brought pressure to bear on Zambia and threatened to cut off all support to Zambia unless she resumed ties with IMF/World Bank and reinstated SAP. Under this pressure Zambia succumbed, abandoned NERP and established a more severe structural adjustment programme in 1989 called the New Economic Programme (NEP). The IMF/World Bank endorsed this programme in 1990.

By late 1990 and early 1991 this state of affairs had changed. The government was reluctant to remove subsidies on essential items such as maize with an election looming in October 1991. The government's stabilisation programme went off track. The central bank adopted a restrictive monetary policy in an attempt to reduce inflation by imposing high reserve requirements and high liquidity ratios. At the same time the government interfered in credit allocation by issuing directives to the commercial banks to extend credit to maize marketing agencies and the mining company. This led to a withdrawal of donor support just before the elections in October 1991.

2.2 THE PERIOD OF FINANCIAL SYSTEM LIBERALISATION, 1992-1996

Following the October 1991 elections, a new government came into power and introduced a programme of economic liberalisation. Market-oriented strategies were to be strictly followed (Woodroofe & Associates, 1994). An important component of the

economic liberalisation policy was the liberalisation of the financial market. The main objectives of financial liberalization were:

- To improve savings mobilization
- To increase the supply of credit or loanable funds
- To promote the efficient allocation of credit.
- To improve investment and investment efficiency
- To promote economic growth

The full package of structural adjustment programme and economic reforms was aimed at spurring economic growth and correcting external imbalances by increasing the role of market forces in the economy. Reforms ushered in trade liberalisation, labour market reforms, the privatisation of state-owned enterprises and measures such as a cash budget to restore fiscal discipline. The government also set up a time frame for establishing an interbank money market and equity securities market. To promote investment through the mobilisation of domestic resources the following institutions were established namely the Zambia Privatisation Agency, Zambia Investment Centre, the Zambia Venture Capital Fund and the Lusaka Stock Exchange.

In the financial sector the government removed all interest rate ceilings and credit directives, foreign exchange controls were abolished and the right to deal in foreign exchange was extended to institutions outside the banking sector. Interest rates were decontrolled in 1992 and in early 1993 the Treasury Bill (TB) tender system became operational mainly for the purpose of financing fiscal debt. The current account was

freed in 1992 with the official rate being allowed to crawl in early 1992. There was a shift from a fixed to a flexible exchange rate regime in 1993. The bureau de change system was introduced in September 1992 under a parallel exchange rate system. Later, the official and bureau de change exchange rates were unified as a single and market determined rate. In 1994 the capital account was freed when the Exchange Control Act was repealed. Indigenous Zambians were now allowed to hold foreign exchange accounts. The Banking and Financial Services Act (1994) was also enacted to strengthen financial system supervision.

The liberalisation era saw the financial system enter into a period of distress, as some banks became insolvent and had to be liquidated. Poor lending policies, leading to a high percentage of non-performing loans, combined with insider-lending and fraudulent management practices, resulted in the collapse of one of the largest indigenous banks Meridien Bank (Z) Ltd. in May 1995. This bank was consequently placed under liquidation by the BOZ. Meridien Bank's international banking network in Europe, USA, the Bahamas and Africa was equally in dire straights and was liquidated by each country's respective central bank. By early 1998 most of the smaller indigenous banks that had sprung into existence during this liberalisation era had collapsed.

Despite liberalisation of interest rates, real rates dropped to highly negative levels in 1991/92 because of the high inflation rate. Money supply growth was very high at 97.7% in 1992 and rose even higher to 132.4% in 1993. Nominal interest rates increased as a result of the introduction of very attractive Treasury Bills, (TBs) in

1993. Inflation still exceeded nominal interest rates thereby keeping real rates negative. Commercial banks excessive liquidity preference contributed to this instability. To curb this, BOZ increased the reserve ratios and introduced penalties. Any bank that had excess liquidity over the limits set by BOZ was levied at a penalty rate. Similarly, if a commercial bank's account was in an overdrawn position it would be levied a penalty. The high nominal interest rates reflected a restrictive monetary policy. The GDP declined over 1991/92, though 1993 posted a marked recovery due largely to the agricultural sector's positive contribution after the poor performance caused by the drought of 1991/92.

In 1993 other secondary measures were put in place to strengthen the BOZ's liquidity management in addition to the reserve and liquidity ratios. In the period 1986 to 1991 money supply had grown at a high rate. To curtail the burgeoning fiscal debt, the cash budget system was to be followed by government. To service domestic debt, there was now a rolling over of debt by the issuing of new instruments to service those falling due. Initially even the interest payments were being financed by the rolling-over of debt. But this led to an unsustainable increase in the domestic debt to K100 billion from K40 billion and consequently the system was changed so that the interest payments were now covered from the budget. By mid-1994 the primary balance (i.e. excluding interest payments) was in surplus.

The TB tender system that was introduced in 1993 was another instrument that the BOZ used to conduct monetary policy. By selling more bills than was required to meet the

budget, excess liquidity could be siphoned from the economy and sterilised. The TBs also helped to set a benchmark for interest rates in the market. When interest rates were decontrolled, there was no mechanism by which BOZ could influence interest rates. The commercial banks were making good profits on account of the large spreads, with lending rates sticky downwards. When the tenders began they were open to both banks and the non-bank public. Soon the interest rates rose and the real rates became positive. As a result, the Kwacha appreciated in value and inflation dropped in 1993 and 1994. By the end of 1994 it had dropped from the previous rate of over 200% for the 1992/93 period to 53% due to continued tight monetary policy and sale of foreign exchange to the market. During 1995 the rate fell to 35.80% but had risen slightly to 43.50% by year-end.

2.3 PERFORMANCE OF INTEREST RATES, SAVINGS AND INVESTMENT

In the period after independence up to 1991, interest rates were administratively fixed and adjusted from time to time as the inflation rate changed. However these changes were still short of keeping the rates positive and real interest rates remained negative for much of the 1980s and early 1990s (see Figure 2.1). In the mid 1980s interest rates were more flexible.

In September 1992 as part of the liberalisation programme of the Fourth National Development Plan, interest rates were now left to market forces and the Government started the auction of TBs in 1993 to provide a benchmark for interest rates. At first

FIGURE 2.1 INFLATION AND NOMINAL RATES OF INTEREST

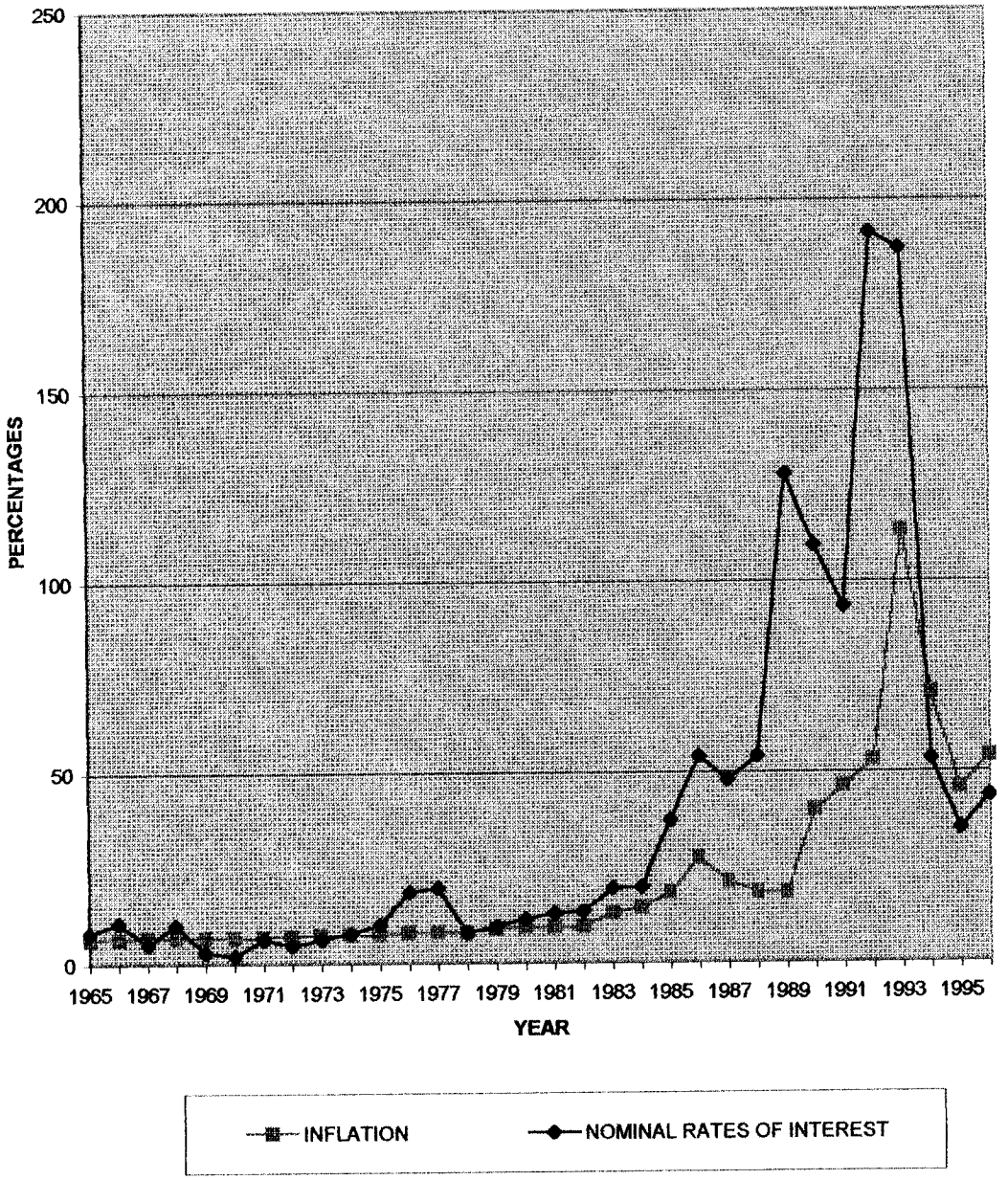


FIGURE 2.2 RATIO OF DOMESTIC CREDIT TO THE PRIVATE SECTOR TO REAL GNP (DCPY)

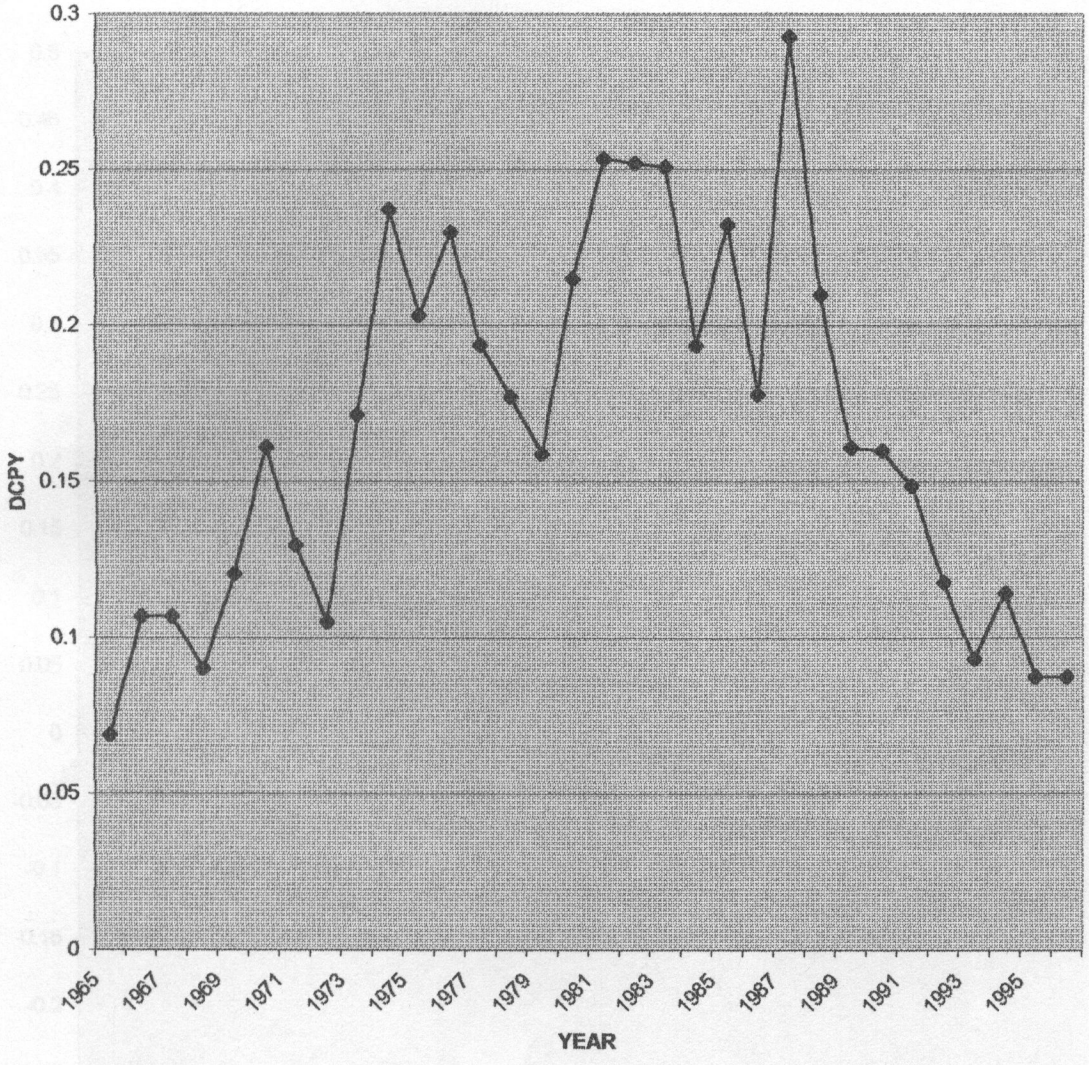
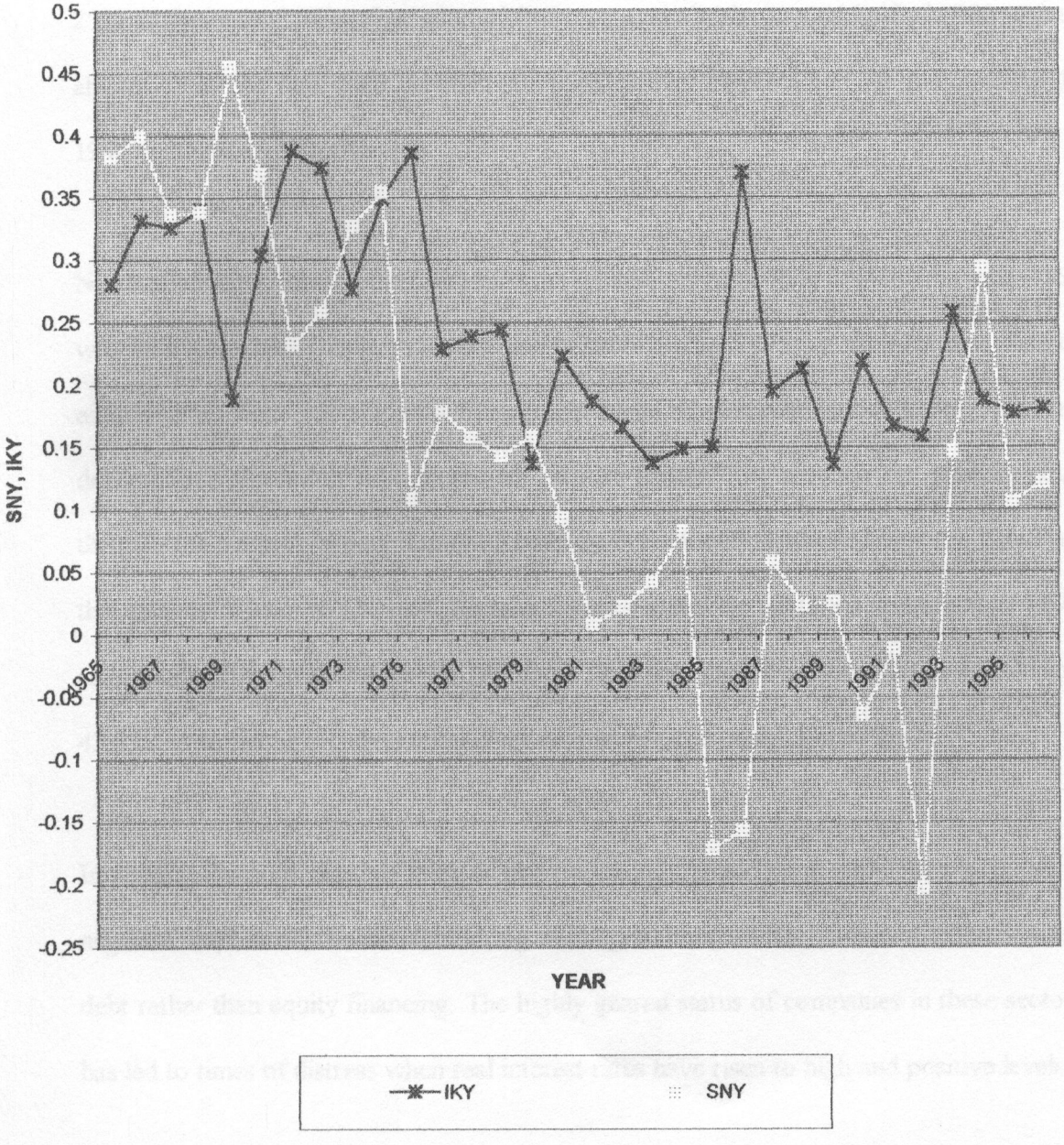


FIGURE 2.3 NATIONAL SAVINGS (SNY) AND INVESTMENT (IKY) RATIOS



TBs started with 28-day maturity, then later to longer maturities of 182 days. Initially the yield rose to as much as 591% in July 1993 but this declined sharply to less than 25% at the end of 1994 (last quarter) but rose again in the second half of 1996 to just above 70%. The real yield between the third quarter of 1993 and the first quarter of 1994 averaged over 100%.

Nominal interest rates started to increase substantially in 1989, though the real rates were still negative. The real rate became positive during 1993 for the first time in over eight years.[4] This was achieved by a combination of reducing money supply, a sharp decline in the inflation rate combined with an upward pressure on the interest rates through the issue of large volumes of treasury bills at market rates of interest. However this was short-lived as the rates became negative again in real terms at the end of 1994 as a result of rising inflation. In 1995 and 1996 the rate of inflation fell to 35.8% and 43.8% respectively, and the real rates of interest became positive once again.

Increasing levels of nominal rates of interest during the early and mid-1990s have had a negative impact on the manufacturing and agricultural sector, which rely heavily on debt rather than equity financing. The highly geared status of companies in these sectors has led to times of distress when real interest rates have risen to high and positive levels.

[4] This is apparent with monthly rather than annual interest rates

The mobilisation of national savings has been declining from a level of 42.5% for the 1965-74 period to a 5.2% in the 1991-95 era. In the second decade after independence it declined by more than half to 18.7%, though in the period 1982-1990 the ratio increased marginally to 20%. By the mid-1990s it had fallen to single digit levels. Financial repressionist policies that kept the real rate negative might have discouraged savers. The savings ratio has in fact declined tremendously over the last decade. Stagnating incomes and persistently high government budget deficits caused this.

In the period after independence there was a good supply of loanable funds and government requirements for credit or deficit financing were low. Most of the credit went to the private sector. The main vehicles for savings mobilisation were demand, savings and fixed or time deposit accounts. Reserve requirements and liquid asset reserves have been used to limit the supply of credit. Liquid asset requirements can have the effect of making available a captive market for the issue of government securities.

This situation changed however, when TBs were introduced. The attractive TB rates resulted in the commercial banks holding more TBs than the minimum requirement. For example from July 1994 when the minimum core asset ratio was reduced to 35%, banks held on average a ratio of 48%, which was 37% above the requirement. By the end of October 1994, the actual ratios held by banks was 51.6% against the required ratio of 35% (Woodroofe, R. and Associates, 1994). This led to a marked drop in credit availability, though there was an offset with the dropping inflation rate that made real interest rates positive after a long time and a lack of demand for credit due to the

economic depression (see Figure 2.2). Also, any crowding out by government is not supported by the nature of loans and advances to the private sector that declined by 5.7% while TBs declined by 22.3% over 1992-1993 period. The TB falling trend was on average, reversed over the period 1990-1994 by an increase of 23%. In addition, of the total commercial banks loans and advances, 32% went to government, the parastatal sector and statutory bodies. This reduced to 22% by July 1994.

Investment has declined tremendously from the copper-induced surplus period of 1965 to the mid-1970s when it was 28.2% to a low of 10.4 % of GDP in 1993 (see Figure 2.3). During the first decade after independence copper prices on the world market were excellent and production levels were high and increasing on an annual basis. Most of the revenues from copper went to finance expenditure on the social sector and the setting up of the parastatal enterprises. However this relatively high investment ratio of the first two decades of the post-independence era could not be sustained. As the government embarked on its developmental strategies, its requirements for credit to finance expenditure and the burgeoning parastatal sector increased. A crowding out of private sector investment resulted. The parastatal sector was not well managed and most of the investment projects were to a large extent politically motivated and were not viable economically.

However when the copper revenues dwindled, investment dropped. The real growth rate of investment was 8% in the first decade after independence but since then on average the growth rate of investment has been negative at –3.1% in the period 1975-1982; and

-8.7% in the period 1983-1990. As aggregate investment declined, government investment also fell and as public revenue decreased, recurrent expenditures share of total expenditure increased and took a large proportion of loanable funds. Parastatal companies which had hitherto relied on state-sponsorship began to perform badly as subsidies were cut or drastically reduced. This meant that by the time reforms were being ushered in 1991 the countries capital stock had been run down and economically depreciated. Privatization of these companies was the only way out. The investment ratio declined to 13.4% by 1996.

2.4 SUMMARY

The Zambian economy from the time of independence has been characterised by the governments' oscillation from a policy of liberalisation to regulation, and back again. Interest rates have on the average, been negative as a result of the high inflation. This has had a detrimental effect on both savings mobilisation and investment that have recorded declining levels over the years.

It is therefore necessary to analyse this performance against the theoretical framework and to draw useful insights from empirical research. Hence the next chapter reviews the theoretical and empirical literature on financial policy and its impact on savings and investment.

CHAPTER THREE

LITERATURE REVIEW

3.0 **INTRODUCTION**

The theoretical framework of any given subject is important as a point of departure for any research on that particular issue. It provides the foundations upon which hypotheses can be formed and tested. It also provides a basis upon which a model explaining the behaviour of given variables is constructed with suitable modifications to suit on the economy being analysed. Hence the relevance of the previous chapter on the Zambian economy, which gives this necessary background.

In the first part of this chapter we look at the theoretical literature on financial liberalisation, analysing the McKinnon-Shaw financial repression paradigm in terms of its background, the various opposing theories, and then finally the extensions that have been made to the model. In the second part we look at the empirical studies that have been done to test the theory with respect to interest rate response of savings and investment.

3.1 THEORETICAL LITERATURE REVIEW

3.1.1 Overview

The theory of financial repression as an impediment to growth originates from the financial sector analysis propounded by McKinnon (1973) and Shaw (1973). McKinnon and Shaw oppose the views of Marx, Keynes and Tobin that call for government intervention to keep interest rates low. They attack Keynes view that low interest rates encourage investment and his inability to distinguish between nominal and real interest rates. Tobin's (1965) monetary growth theory claims a negative impact of a higher real return on money holdings on welfare in the medium run, but is silent about short run effects. These financial repressionist policies advocated by Marx, Keynes and Tobin have been followed in many developing countries throughout the world. McKinnon and Shaw argue that the underlying assumptions, such as developed capital markets and the government's fine tuning role in adjusting the rate of capital accumulation in monetary models are erroneous where developing countries are concerned.

In McKinnon's model real money balances are complements to, rather than substitutes for, tangible assets or investment. Shaw rejects Keynes' finance motive and neoclassical monetary growth models and produces the debt intemediation view. He uses a model in which money is backed by productive investment loans to the private sector which he calls inside money, since it is based on the internal debt of the private sector (Fry, 1988). McKinnon follows Tobin in developing a model based on commodity or outside money. Outside money is issued as loans to the government, it is not available to fund private

sector investment i.e. the investor is confined to self-financed projects. Extensions to this McKinnon-Shaw framework use inside money.

The McKinnon-Shaw model is based on a developing economy that is financially repressed. The model uses inside money with financial institutions intermediating between surplus spending units (savers) and deficit spending units (investors). A financial market is repressed if the rate of interest that prevails is kept at a level which is below the equilibrium rate of interest. Hence McKinnon and Shaw define financial repression as artificially low deposit and loan rates that give rise to excess demand for loans and to non-price credit rationing (McKinnon, 1973). This is evidenced by government interventionist policy of imposing ceilings on nominal interest rates and accompanied by direct control of credit allocation and high reserve requirements. Such polices are inimical to economic growth and lead to ill-functioning financial markets.

The main elements of the McKinnon-Shaw theory are: (a) a saving function that responds positively to both the real rates of interest on deposits and the real rate of growth in output; (b) an investment function that responds negatively to the effective real loan rate of interest and positively to the growth rate of output; (c) an administratively fixed nominal interest rate that holds the real rate below its equilibrium level; (d) inefficient non-price rationing of loanable funds (from Fry, 1998, p. 9; McKinnon, 1973, pp.71-77; Shaw, 1973, pp.81-87).

The central thesis can be illustrated by Figure 3.1. The market demand curve for

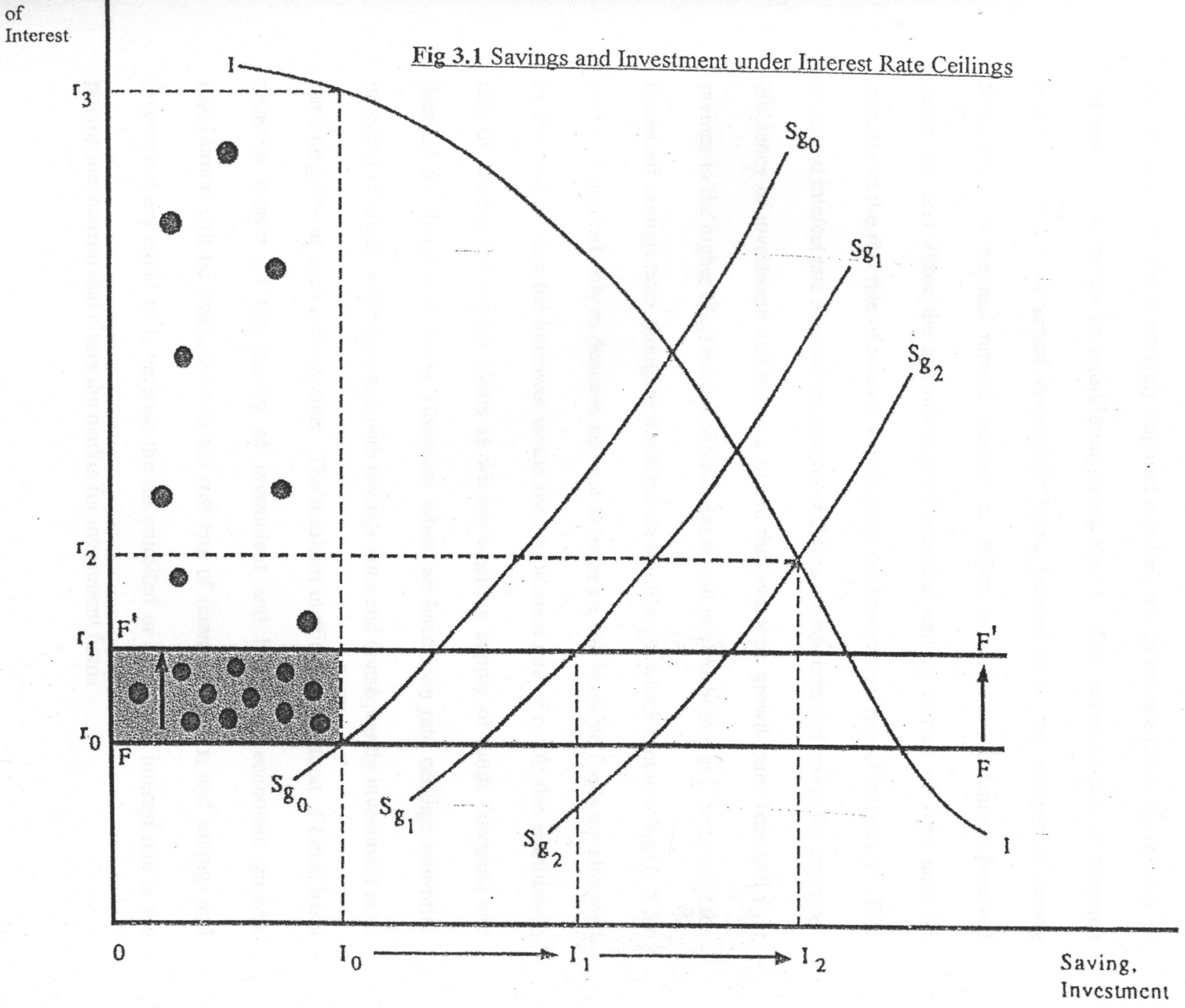


Fig 3.1 Savings and Investment under Interest Rate Ceilings

investment is downward sloping and the supply of savings is upward sloping, the economy is growing at various rates of growth each with its corresponding savings rate, Sg_o, to Sg_2. An administratively imposed nominal rate of interest holds the real rate of interest, r at r_0 below its equilibrium level, Sg_0/ I. This manifestation of financial repression results in actual investment being limited to I_0, the amount of saving forthcoming at the real rate of interest, r_0. When we relax the extent of financial repression and allow the administratively imposed ceiling to rise we then have an increase in the real rate of interest which gives us the new real rate of interest, r_1. This increased interest rate now rations out low-yielding investments and makes for improved efficiency of investment and hence a rise in the economic growth rate. This will shift savings to the higher $S(g_1)$ curve and investment will now be higher at I_1 because of the increased savings ratio, though it is still below equilibrium which is now at Sg_1/ I. If the ceiling is applied only to deposits and not to loans i.e. the loanable funds are allocated by the market, then the borrower would face an interest rate of r_3. At this equilibrium rate of interest the market clears as we are equating supply of funds (savings) and demand for investment funds. However, when we have loan rate ceilings non-price rationing of credit will take place with savings rates and consequently investment rates remaining low at such interest rates. The resultant inefficient allocation of funds has a negative impact on the quality of investment and hence on economic growth. Equilibrium will be reached when the real rate of interest equals r_2 and savings and investment are equal to I_2 because the decontrolled or liberalised interest rate is the pricing mechanism that clears the market for investment funds.

3.1.2 **McKinnon's complementary hypothesis**

McKinnon's analysis of financial liberalisation policy is called the complementarity theory and is based on the assumptions that all economic units are restricted to self-finance and that investment expenditures are lumpy and indivisible, making up the major component of a firm's total expenditure. McKinnon's theory is an outside money model. This entails the accumulation of money balances or savings to get adequate money balances for investment. "Thus, the relative lumpiness of investment expenditures implies that aggregate demand for money will be greater, the larger the proportion of investment in total expenditure." (Fry, 1988, p. 20) Therefore a higher positive real deposit rate is the incentive to invest because saving is now rewarding and the amount of internally financed investment is raised.

The complementarity hypothesis emphasises the complementarity between money and the process of capital accumulation with "money supply having first-order impact on decisions to save and invest" (McKinnon, 1973, p.60 in Fry, 1988). The importance of deposits in self-financed investment is emphasised. McKinnon (Fry, 1988) posits that a rise in the deposit rate of interest will make savings profitable.

Complementarity hypothesis leads to the following money demand function:

$$M/P = F\,(Y, I/Y, d\text{-}\pi^{e}) \qquad (3.1)$$

where the three partial derivatives, $F_Y > 0$; $F_{I/Y} > 0$; $F_{d\text{-}\pi e} > 0$, and M is broad money M_2, P is the price level, hence M/P is real money stock, the current income Y captures

the transactions motive for holding money, I/Y is the ratio of gross investment to GNP and d- π^e is the real deposit rate of interest (d is nominal deposit rate of interest and π^e is expected inflation) or real return on money holding. The following investment function expresses McKinnon's complementarity hypothesis:

$$I/Y = F(r^t, d- \pi^e) \qquad (3.2)$$

where r^t is the average return to physical capital and d- π^e is the real return on money holding. Complementarity appears in the following partial derivatives:

$$\partial(M/P)/\partial(I/Y) > 0; \ (I/Y)/(d- \pi^e) > 0$$

If the real return on holding money increases, self-financed investment will also rise, but if the desire to hold real cash balances falls, then the opportunity cost of saving for self-finance also falls. Money is a conduit for capital accumulation and is not therefore a competing asset, as the neoclassicists would postulate, as there is complementarity between money and physical capital. McKinnon says a deflationary policy can increase demand to hold real cash balances. Raising nominal interest rates has a similar effect. The resulting increase in the real return on holding money can increase the saving-investment propensities due to the role of money as a store of value.

3.1.3 **Shaw's debt intermediation view**

Shaw's (1973) model highlights the differences between financial systems in developed and developing countries with respect to their role of financial intermediation. For developing countries, the intermediation function is very limited and even more so for

the allocation function. Shaw's model is based on inside money, where firms are free to borrow. Therefore, the amount of credit available for lending by financial intermediaries is important. His debt-intermediation theory postulates that higher real institutional interest rates will enhance financial intermediation between savers and investors. According to Shaw "the raised real deposit rate of interest increases the incentive to save, while lowering the real costs to investors by accommodating liquidity preference, reducing risk through product diversification, reaping economies of scale in lending, increasing operational efficiency and lowering information costs to both savers and investors through specialisation and division of labour" (Fry, 1988, p. 21).

According to debt-intermediation theory, money is backed by productive investment loans to the private sector. The larger the money stock in relation to the level of economic activity, the greater is the extent of financial intermediation between savers and investors through the banking system. Shaw posits that financial liberalisation and financial development increase financial intermediation as savers are attracted by the higher real interest rates. The increased availability of funds increases both the quantity of investment as well as investments efficiency.

The debt-intermediation view can be shown in the money demand function:

$$M/P = F(Y, \nu, d\text{-}\pi^{e}) \qquad (3.3)$$

where ν is a vector of opportunity costs in real terms of holding money (Shaw 1973,

p.62)

Real yields on all forms of wealth have a positive relationship with savings ratios. Shaw's debt intermediation view emphasises the role that deposit accumulation plays in expanding the lending capabilities of financial intermediaries.

3.1.4 **McKinnon-Shaw financial repression paradigm**

Molho, (1986) argues that the McKinnon and Shaw's theories complement each other since in reality investment projects are financed partly by owners funds and partly with borrowings. By showing the lag aspects of the impact of interest rates on savings, investment and asset holding decisions, Molho posits that the intertemporal nature of complementarity implies that current deposits finance future investment. Deposits are a "temporary abode" of funds that make a conduit for capital accumulation (Molho, 1986). The McKinnon-Shaw theory emphasises the importance of financial intermediation and the complementarity of money and physical capital and claims that economic growth will be increased by more efficient investment.

The theory postulates that the lifting of repressionist controls by liberalisation of the financial sector will increase the propensity to save in financial assets and improve credit allocation and lead to efficient investment and consequently to economic growth. As such reform policies focus on the freeing of interest rates, reducing or eliminating government control over credit allocation, easing restrictions on the entrance of new

financial institutions onto the market and the lifting of controls on foreign exchange and capital flows.

McKinnon and Shaw believe that many countries did not deliberately embark on financial repressionist policies. Rather, the original objective was a policy of restriction that made financial institutions to adopt instruments from which seigniorage could be extracted only by government and discouraged those that were not profitable to the government. The financial systems of these countries were dominated by commercial banks and development finance institutions such as agricultural and development banks which were small in comparison to commercial banks. Most governments established these banks or financial institutions so that they could play a direct role in resource allocation at low, subsidised interest rates. Capital markets and the issue of private bonds could not be used for seigniorage and were therefore discouraged. Where the equity markets were sizeable, their role in financial intermediation was very limited. Government bond markets were used by those obliged to hold such bonds to satisfy liquidity ratio requirements or for those bidding for government contracts. Monetary policy was exercised through the financial sector, which meant that the government's impact on the amount and form of investment went beyond their own investment spending. As a result there was no need for setting higher interest rates.

The high inflation rates in developing countries are another form of tax. The central bank is the tax collector, the tax base is reserve or high-powered money, and the tax rate is the rate of inflation (Fry, 1998). Those economic agents holding currency are paying

tax since purchasing power is being eroded with time. The high reserve requirements in these economies are also a form of financial repression. Reserve requirements that are usually three times higher than in developed economies, are a tax on commercial banks.

Administratively fixed interest rates are however, the most common form of financial repression. The tax is imposed on depositors when the government sets ceilings. In the absence of deposit rate ceilings, depositors would still have to bear the tax since commercial banks need to acquire assets that yield net returns below world market interest rates.

Selective or sectoral credit policies are put in place to reduce costs of financing government deficits. The negative interest rates are used and act as an incentive to encourage the private sector to invest in what the government regards as priority development areas. Such loans carry subsidised interest rates. Selective credit policies are an essential element of financial restriction, since channels would otherwise develop to allocate this low cost credit to more profitable uses. Another effect of selective or directed credit programs is the high delinquency and default rates that reduce the flexibility (less credit available for new investment) and increase the fragility of financial systems.

When the nominal interest rate ceilings imposed for seigniorage purposes are combined with high inflation, portfolio shifts from financial to tangible assets occur. For instance, real estate becomes an increasingly profitable abode for savings as real interest rates

fall. Because of the fixed supply nature of land, the increased demand for land pushes up its price at a rate faster than the increase in the general price level. With higher real land prices and no change in real incomes, the household sectors wealth to income ratio rises (Fry, 1988). According to savings theories, this increase in wealth raises present and future consumption resulting in a decline in the propensity to save out of current income.

Where there are ceilings on loan and deposit rates of interest non-price rationing of loanable funds occurs. Credit is allocated according to transaction costs and perceived default risks. Quality of security, political influence, status, loan size, and "palm greasing" of bank officials also help to determine allocation. Loan rate ceilings tend to discourage risk taking by financial institutions since risk premiums cannot be charged when there are ceilings. This results in problems of adverse selection because a large proportion of profitable high yielding investments are rationed out and those yielding returns barely above the ceiling will be financed.

McKinnon and Shaw therefore recommend the raising of institutional nominal interest rates or the reduction of the rate of inflation, in order to make the real rate of interest positive. For developing countries stability is not easy to achieve especially in the short run. Removal of interest rates ceilings is much easier and is therefore recommended.

In recent analyses, McKinnon (McKinnon, 1994), (Fry, 1995) has emphasised the need to control public expenditure as a prerequisite for financial liberalisation. This is

because government deficits are usually financed by taxing the domestic monetary system, in one way or another. Use of the inflation tax on domestic financial intermediation leads to the imposition of foreign exchange controls to prevent capital inflows and outflows. Such controls are not compatible with financial liberalisation policy.

3.1.5 **Opposing theories**

The McKinnon-Shaw financial model has aroused a lot of interest and drawn much criticism. In direct opposition to the McKinnon-Shaw school are the Neo-structuralists led by Lance Taylor. They posit that a restrictive monetary policy that raises interest rates causes stagflation (accelerating rate of inflation and a reduction in output) in the short run. The increase in the interest rate causes credit to become expensive, leading to a shortage of working capital and a reduction in investment. The end result is a drop in output.

Neo-structuralists argue that the market-determined nominal interest rate in the curb market or non-institutional credit market adjusts to equate demand and supply of credit. Income also adjusts to equilibrium demand and supply of the goods market. To the neo-structuralists, curb markets are a crucial feature of developing economies and any model that looks at LDCs must necessarily include informal financial markets. Curb markets are an important component of the financial sector as funds flow freely between the banking system and the curb market. They therefore advocate for the use of the curb market rate of interest in empirical studies. The size and impact of this sector has

however, proved difficult to quantify because of its very nature and statistics obtained may not be very reliable.

One of the leading critiques of the McKinnon-Shaw model in the structuralist vein is Van Wijnbergen. His model (Van Wijnbergen, 1983) analyses the effect of financial liberalisation basing it on the portfolio behaviour of individuals. Van Wijnbergen's quantitative exposition has three portfolio choices facing the household, namely deposit accounts, physical goods such as land and lending in the curb market. He finds that households transfer funds from curb market loans into time deposits when the time-deposit rate is increased. This will result in a reduction in the supply of loanable funds and an increase in the interest rate in the curb market. A tight monetary policy squeezes total credit availability and will consequently reduce growth because of stagflationary effects. Van Wijnbergen's analysis has been criticized because it is based on comparative statics and lacks appreciation of the long-run positive effects that improved investment efficiency and savings can have on the curb market.

A more successful criticism has been by Stiglitz and Weiss (1981) who analysed imperfect markets and their deleterious impact on the efficacy of the financial system. The market imperfection theory states that in an imperfect market, such as we find in developing countries, information costs about borrower's riskiness are high, especially about new borrowers. Informational asymmetries lead to problems of adverse selection and moral hazard. Credit rationing occurs as evidenced by the accommodation of only those borrowers who are already known to the lenders even though their projects may

not necessarily be the most viable. According to Stiglitz and Weiss even if the loan rates of interest are raised, they will not result in increased bank profits because banks find it too costly to assess the credit worthiness or default risk of potential borrowers. Hence the positive response of investment and investment efficiency will be lacking as a result of asymmetric information problems between borrowers and lenders.

Stiglitz and Weiss advocate for government intervention to keep interest rates below their market equilibrium levels. Financial repression can improve the efficiency with which capital is allocated, they argue. By lowering interest rates, financial repression can improve the average quality of the loan applications. Secondly financial repression increases firm equity because it lowers the cost of capital. Thirdly, directed credit programmes encourage lending to sectors with high technological spillovers.

Fry (1997) agrees with Stiglitz and Weiss on the importance of information imperfections and the necessary role that government intervention plays in the area of prudential regulation and supervision but differs with them over the case for financial repression. He believes the lowered rate of interest accommodates lower-yielding projects, while rationing may make borrowers resort to the curb market. Because only known borrowers are catered for, this discriminates against new investors and creates a monopoly power (Fry, 1997).

Stiglitz (1993) also maintains that real deposit rates should not be below zero. As an upper bound, real loan rates over 10% are likely to indicate distress borrowing and

pathological behaviour by banks. This effectively implies a maximum real deposit rate of only 4-5% if banks are to remain solvent. Fry, however, believes this figure is unattainable for most, if not all developing countries since bank-operating cost ratios in developing countries are twice the level of operating cost ratios in countries of the Organisation for Economic Co-operation and Development (OECD).

Dornbusch and Reynoso (1989) have likened the financial repression paradigm to supply-side economics. They postulate that the income and substitution effects of the increase in interest rates, render the overall effect ambiguous though they note that one of the benefits of financial liberalisation is the portfolio effect whereby savers shift from non-financial assets to financial assets resulting in improved financial intermediation. They therefore argue that the investment rate should not be included in the money demand function because complementarity is no more than the influence of the rate of interest on savings mobilisation.

Others like Lahiri (1989) posit that for LDCs the demand for credit is insensitive to the cost of credit and that rather it is the availability of credit that is the important variable. De Gregorio and Guidotti (1995) claim that real interest rates are not a good indicator of financial repression and note that the relationship between real interest rates and economic growth may resemble an inverted **U** curve. Here, very low and negative interest rates cause financial disintermediation, as per McKinnon-Shaw hypothesis, but high real interest rates lead to a disincentive to invest, and any investment undertaken is in very risky projects. Fry (1998) finds that this could lead to reduced measured

national saving if the increased risk makes savers move their savings abroad through underinvoicing or overinvoicing.

3.1.6 **Extensions to the McKinnon-Shaw model**

Kapur, Mathieson, Fry and Galbis and many others have extended the McKinnon-Shaw model. In Kapur's (1976a) model inflation is determined by rates of monetary expansion and real economic growth in the long run. Money demand in real terms is determined partly by the real deposit rate of interest. The real money demand declines when inflation rises and the nominal deposit rate of interest is static. Consequently an increase in the nominal deposit rate of interest increases real money demand and hence causes supply of bank credit to rise. This implies that raising the nominal deposit rate towards its competitive free-market level will lead to enhanced economic growth through the credit availability mechanism. Imposition of a high-required reserve ratio can counteract this effect.

Mathieson's (1980) model differs from Kapur's by bringing in a behavioural saving function for firms whose savings will lead to capital accumulation. Savings rates are influenced by the fixed real return on capital and real loan rate of interest. Growth is greater the higher the real return to investment, the lower the nominal loan rate, the higher the expected inflation rate and the higher the output/capital ratio. In the steady state with a competitive banking system that incurs no costs, demand and supply of loans determine the equilibrium deposit rate of interest.

Galbis (1974) studied the impact of financial repression on the average efficiency of investment by using a two-sector model made up of a traditional and a modern sector. The capital/output ratio is positively related to the real deposit rate and an increase in this rate reduces investment in the traditional sector and increases investment in the modern sector.

Fry's investment function is based on the flexible accelerator model (see Fry, 1988) that brings in adjustment lags by including the previous year's growth rate. The adjustment coefficient is influenced by economic conditions such as terms of trade, domestic credit conditions and world real rate of interest. Under disequilibrium interest rate conditions with credit availability a constraint, the price of credit becomes an important variable. Banks that specialise in information about default risk tend to ration out some bank borrowers.

Fry's more recent studies (1995, 1998) also cover export and import functions that include the real exchange rate and exogenous variables such as foreign direct investment. Kapur (Fry, 1988) and Mathieson (1980) use the exchange rate as an additional policy instrument. The exchange rate is allowed to deviate from purchasing power parity. Kapur (Fry, 1980) posits that as part of the reform, the real exchange rate may have to depreciate, though not by the full extent necessary for trade balance. Mathieson's model provides two policy instruments that have to be used independently of each other, namely the rate of change in the nominal exchange rate and the rate of monetary growth. Fry shows that inflation can be controlled by an initial discrete

increase in the deposit rate and loan rate, an overdepreciation of the nominal exchange rate and a decline in the rate of growth in domestic cash. The effect is an instant rise in the rate of change in output as a result of financial liberalisation. After these discrete changes a gradual reduction in the interest rates and then a gradual appreciation in the exchange rate, followed by a gradual rise in the money supply will reduce the rate of change in GNP gradually to its steady state values.

During the last ten years a second generation of financial growth models which include endogenous growth and endogenous financial institutions have arisen. The Diamond and Dybvig (1983) financial intermediation model is one of such models that have received a lot of attention. In the model, an individual can choose between investing in unproductive assets (such as consumer goods or commodity money), and investing in a firm. Investing in a firm is not liquid and differences in productivity risk in firms can act as a deterrent for those investors who are risk averse. Investing in the more liquid consumer goods or currency does not yield any return.

Bencivenga and Smith (1991,1992), Greenwood and Smith (1997) and King and Levine (1993) have embedded the Diamond-Dybvig model in an overlapping generations model where the introduction of banks enables individuals to hold deposits which banks can invest in currency or capital. By engaging in maturity transformation, banks offer liquidity to depositors and longer-term funds to investors. They conclude that financial liberalisation has positive effects on economic growth through this enhanced financial intermediation channel.

Greenwood and Jovanovic (1990) do not use the Diamond-Dybvig model, but nevertheless present other ways in which financial institutions can stimulate endogenous growth. Greenwood and Jovanovic emphasise the ability of banks to allocate their pool of funds to its most productive use because they have the information that can enable them to make portfolio choices. King and Levine state that by financing the most promising projects, financial systems contribute to economic growth. They find that financial intermediation plays a positive role in increasing savings and investment.

In summary there are a lot theoretical arguments for and against financial liberalisation theory. A major factor that all agree upon is the importance that a financial system, and especially commercial banking plays in this process.

3.2 **EMPIRICAL LITERATURE REVIEW**

3.2.1 **Introduction**

The review in this sub-section looks at a representative body of empirical studies that have been done on the effects of financial conditions, particularly responsiveness of savings and investment to increases in the rate of interest.

There are three main types of studies that are undertaken, namely

- cross-country pooling
- country-specific

The most commonly used are the cross-country pooling studies while country specific studies are few. At best cross-country pooling can only capture 'average relationships' (Montiel, 1995) whose usefulness to the individual country is fairly limited. Cross-country pooling regression studies have looked mainly on financial development and growth e.g. King and Levine (1992, 1993) though only a few studies have taken care of the heterogeneity factor in their study. In the few country-case investigations the descriptive methodology is the norm, with quantitative studies having been done only in the recent past. Very few quantitative studies have used cointegration analysis, especially in Africa.

Empirical investigations into the interest elasticity of savings and investment have failed to settle the debate, and there exists a large body of evidence on both sides of the argument. Much of the difference in the empirical results is as a result of differences in measurement and definitions of data, especially for savings and interest rates. Generally, McKinnon defines national savings as financial savings and does not take real savings into account. Gross national savings are widely used because it reflects a country's own efforts to mobilise funds. It is defined as domestic savings plus net factor incomes from abroad. Gross data is used because the method of calculating depreciation allowances in LDCs is questionable (Fry, 1988). The lack of and the unreliability of disaggregated data disqualifies the use of private or household savings and renders national savings a much more meaningful definition (Fry, 1980). Here, the definition of private savings is usually gross investment minus foreign and government savings. Gupta (1984) in his study used the two measures and found that his results for the

private savings function had unsatisfactory signs and significance as did Mwega, Ngola and Mwangi (1990), whereas Lahiri (1989) finds a positive response only in the long-run. Others say aggregation obscures the offsetting relationship between government savings and private savings.

The tendency in developing countries to hold savings in the form that is not captured in the national accounts gives an undue downward bias on savings ratios. Most households prefer to hold land and real estate as well as cattle and jewelry, both as inflation hedges and as repositories for their savings. There is also an understatement of financial depth, savings and investment because the informal sector, which plays a significant intermediation role, is not included in the national accounts.

The definition of interest rates differs widely, depending on the context. The use of the deposit rate of interest as a proxy for loan rates of interest rates is warranted by the fact that the real deposit rate of interest acts as an inverse proxy for the real loan rate. When the real deposit rate is held below its free market equilibrium the effective loan rate declines as the real deposit rate increases. As a result, the real deposit rate is substituted for the cost of domestic credit to the private sector in the investment equation. Montiel (1995) in his study uses a different measure of financial conditions to detect the presence of financial repression. He measures the extent to which the government is extracting resources from the financial system or the extent of seigniorage by use of implicit or explicit taxation.

Some advocate for the use of inflation as a separate independent explanatory variable in the savings and investment models instead of it entering as a deflationary variable for the nominal interest rate. When this is done, the coefficients for the interest rates are raised. Ram (1982) and Rossi (1988) find that the population dependency ratio is not an important variable in explaining savings behaviour for developing countries. This is especially true for country-specific time series analysis, probably because the variation over time of demographic variables is relatively small. Much better results have been achieved with using this variable in cross-country pooling.

3.2.2 **Savings models**

Fry (1980, 1988) models savings behaviour for a group of seven developing countries using 1960s data based on the life cycle hypothesis and finds an interest rate coefficient of between 0.1 to 0.2 for private savings and national savings. He estimates the following domestic savings function by Two-Stage Least Square (TSLS):

$$Sd/Y = f(g, Y, r, Sf/Y, Sd/Y_{-1}) \qquad (3.4)$$

where Sd/Y is domestic savings rate, Sf/Y is foreign savings ratio, r is real rate of interest, g is the rate of growth in income, Y is per capita income and Sd/Y_{-1} is lagged savings ratio. Fry asserts that since saving and investment are not jointly determined in LDCs, the instrumental variable approach can deal with the problem of endogeneity of some of the explanatory variables. He finds that small changes in the nominal interest rate can cause a downward bias in the estimated interest elasticity of savings. When the

real rate of interest rises by one per cent, the domestic savings ratio increases by 0.16 to 0.21 per cent.

The Fry-Mason (Fry, 1995) saving function of 1992 was estimated on pooled time series data for seven Asian countries using Two Stage Least Squares. Re-estimation of this function using the same data definitions and TSLS with dummy variables gave similar coefficient values. Dummies were used because official exchange rate conversions of per capita income and the money stock did not provide purchasing power parity. Later studies included foreign savings as an exogenous variable and added on the terms of trade changes, due to the increased foreign indebtedness of the developing countries that rendered real GNP a poor proxy for income growth. Fry's 1986 saving function (Fry, 1988) included the lagged dependent variable but did not include the variable rate-of-growth effect.

It was found that an increase in the real deposit rate of interest has a statistically significant effect on the national savings rate. From the above studies the real deposit rate is subject to an upper bound at its competitive free-market equilibrium level normally lying between 0 and 5 per cent. This means that the real deposit rate must be negative by a large margin for any increase in it to directly raise the savings rate.

Yusuf and Peters (1984) estimate an aggregate savings function based on the permanent income hypothesis for Korea for the same sample period as Fry, 1965-82. The equation is as follows:

$$S = f(Y, PY, g, r, P, Sf) \quad (3.5)$$

where S is aggregate saving, Y is current income, PY is permanent income, g is the growth rate of income, r is the real rate of interest on time deposits, P is the inflation rate and Sf is foreign saving. The GNP deflator was used to derive real values. The OLS estimation technique was used with the assumption of exogeneity of the independent variables to deal with problems of bias or inconsistency of the independent explanatory variables. Their results support the financial liberalisation theory.

Giovannini (1983) disagrees with Fry's positive interest rate response of savings. He takes the same sample of countries as Fry's 1978 model and gets a positive coefficient although it is less significant, on the interest variable. He claims that the Korean reforms of 1965 exert undue upward pressure on the coefficients of the estimated parameters. But Fry has countered this claim because even when he removes Korea from the sample the results are still positive. Giovannini's results for the same countries but with a longer sample period produce a negative though insignificant coefficient. Gupta (1984) uses a totally different methodology and obtains equally different results, therefore questioning Fry's and Yusuf and Peters' (1984) results.

He does an ordinary least squares regression based on the permanent income hypothesis for twelve Asian countries for the period 1960-77 using the following savings equation:

$$S = s(YP, YT, PE, PU, NI, FIR, VE) \quad (3.6)$$

where YP is permanent income , YT is transitory income, PE is the expected inflation rate, PU is unanticipated inflation, NI is nominal 12-month rate of interest, FIR is the financial intermediation ratio and VE is the uncertainty rate with respect to inflation. His model attempts to establish the differences in the effects of the changes in the nominal rate of interest and the expected change in the real rate of inflation. He uses two definitions for savings namely, aggregate savings and private savings and finds unsatisfactory signs and significance levels for the private savings function and rejects the null hypothesis in all but four of the countries. Gupta's studies find the interest rate inelasticities in the short run provide support for Shaw's debt intermediation view and no support for McKinnon's complementarity hypothesis. Fry finds a positive relationship and that Shaw's debt intermediation view is the transmission mechanism. Van Wijnbergen (1983) posits that the ~~up~~surge in the Korean savings rate was ~~not due~~ to additional savings per se but rather to the substitution into time deposits from the curb market and was a one-time, though large increase.

Leite and Makonnen (1986) in their cross-country pooled study of the six BCEAO countries with a sample period 1967-80, regress gross private savings on real rates of interest, disposable income, changes in disposable income, share of exports in GDP and the lagged dependent variable. They find positive and significant coefficients for each of the explanatory variables.

Molho (1986) brings to attention the limitations in the complementarity hypothesis because studies that reject it do not interpret the results correctly, as the lag structure is

not taken into consideration. For example he cites Gupta's investment function estimate for a number of LDCs which does not relate current investment to past financial savings and past rates of return. Molho claims Fry and others are wrong to test complementarity by simply regressing money demand on contemporaneous explanatory variables.

Lahiri (1989) has also noted the adjustment lags inherent in savings behaviour but finds that the impact of terms of trade changes can be ambiguous and the results mixed depending on which effect or hypothesis is tested. For instance he finds that on average a 1.0 per cent decrease in the dependency ratio results in a 1.6 per centage increase in the private savings ratio in the long run for India, Singapore, Malaysia and Sri Lanka. Lahiri calls attention to the short and long run differences in savings behaviour and highlights the procyclical nature of savings behaviour in the short run and secular constancy of savings in the long-run error correction framework. In his 1988 study into the role of growth and age structure in Asian savings, Lahiri finds that there is a weak and negative relationship between savings and inflation. He also confirms the Larsen-Metzler-Harberger[5] effect of a negative impact of permanent terms of trade on savings (Lahiri, 1988).

Negative results are found in pooling across continents. Greene and Villaneuva (1991) in their study on savings found negative and significant coefficients for both the nominal interest rate and the inflation rate variables. The inclusion of Latin American countries

[5] Here an improvement in the terms of trade is supposed to lead to an increase in savings and an improvement of the trade balance. A transitory improvement causes a transitory change in income and

leads to poor results because financial conditions do not matter to aggregate savings performance in LA countries. Empirical studies highlight the view that there are regional differences in savings response to interest rate changes (Ogaki, Ostry and Reinhart, 1996). This is because of the structural rigidities in the less developed regions such as Africa and Latin America that cause high real interest rates to reduce profits and private investment, thereby contradicting financial liberalisation theory. For example, in Mexico and Brazil the greater financial intermediation did not increase capital formation, but resulted in increased demand for short-term credit to finance the purchase of consumer durables by the higher income groups. Such differences in results highlight the need for country-specific studies.

Soyibo and Adekanye (1992) and Soyibo (1996) in their estimations based on Nigerian data find that the ex-post real interest rate and the lagged aggregate savings ratio as well as lagged aggregate savings are significant determinants of savings. The debt intermediation theory by Shaw was found to be the applicable transmission mechanism. When Mwega, Ngola and Mwangi (1990) estimate Fry's and Giovannini's model using 1960-85 annual data, they obtain negative interest rate elasticity of private savings and a negative, significant relationship between lending rates of interest and demand for private sector credit. They find that this leads to a fall in manufacturing output that is consistent with Taylor's structuralist critique of the stagflationary impact of financial liberalisation.

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leads to higher saving rather than higher consumption. Permanent shocks lead to an ambiguous effect which is small in magnitude

Rossi (1988) explains that the zero or near zero interest rate sensitivity of savings in LDCs is due to the near subsistence levels of consumption that obtain here. Hence the intertemporal substitution in such households is low or absent.[6] Osaka, Ostry and Reinhart (1996) test the hypothesis that as a country's level of wealth rises there is a positive impact on its propensity to save and secondly, that savings are more interest elastic as the country's level of income rises. They use a sample of thirteen low-to-middle income countries for the period 1968-92 and a broader "out of sample" set covering low-to-high income countries, in which Zambia is included. The results support their hypothesis. They find that the intertemporal elasticity of substitution for Zambia is 0.279 and 0.527 for the lower and upper bound respectively - as the elasticity tends to zero, savings fall and the growth rate drops, thereby rendering the interest rate response of savings poor.

3.2.3 **Investment models**

The results of studies reported by Fry (1980) are consistent with the credit availability mechanism on pooled time series estimates of domestic credit equations showing statistically significant coefficients. The investment rate is positively related to the availability of domestic credit as measured by the ratio of domestic credit to GNP or the change in real domestic credit divided by GNP. This is found to have a highly

[6]If a household needs to first attain a subsistence level of consumption before it can let intertemporal considerations guide their decisions only for that portion of their budget left after subsistence has been satisfied, then the intertemporal elasticity of substitution and the interest rate sensitivity of private savings will be close to zero for countries at or near subsistence consumption levels, and will rise thereafter (Ogaki, Ostry and Reinhart, 1996)

significant positive coefficient when TSLS is used to estimate time-series data of the accelerator model. Another estimate of the flexible accelerator model by Fry includes the world rate of interest proxied by the real export yield on six month US treasury bills. Again the coefficients are found to be significant.

In their study on the impact of both risk and return on the process of capital formation, for 16 Latin American countries, Vogel and Buser (1976) find support for the complementarity process. Their index for financial repression shows that repression has a negative impact on investment. A significant positive impact was noted between the growth rate of real time and savings deposits and capital formation emphasising the important role that savings play in this process. Dooley, Frankel and Mathieson (1987) also find a positive correlation between savings and investment in empirical studies at both levels and changes especially in developed countries.

Haque, Lahiri and Montiel (1993) investigate the impact on domestic investment of the real domestic interest rate in pooled time series studies for a large number of LDCs. They follow Fry in using the shadow real domestic interest rate as the explanatory variable and find negative, significant but small coefficients. Rittenburg (1991) finds that investment is positively correlated with below equilibrium interest rates and negatively correlated with above equilibrium interest rates in his study on Turkey.

Oshikoya (1994) studied the macroeconomic determinants of domestic private investment behaviour for African countries for the years 1970-88, by dividing them

into middle income (Cameroon, Mauritius, Morocco and Tunisia) and low income (Kenya, Tanzania and Malawi) groups, as well as by individual countries. He estimates the following equation:

$$IP = f(GR, GI, BC, CPI, TOT, RER, DSR, IP_{-1}) \quad (3.7)$$

where IP is the private sector-investment to GDP; GR is the percentage change in real GDP; GI is the ratio of public-sector investment to GDP; BC is the change in credit to the private sector; CPI is the percentage change in the consumer price index; TOT is the change in terms of trade; RER is the index of the real exchange rate; DSR is the lagged ratio of external debt service payments to exports of goods and services and IP_{-1} is the lag of the dependent variable.

He includes dynamic specifications to get short and long run influences. For the output growth rate's impact on private investment, he finds a positive and significant *relationship for low-income countries (LICs) and an insignificant relationship for middle* income countries (MICs). For individual countries he finds a significant and positive coefficient, except for Cameroon. A differenced output growth rate is included in the regression for purposes of capturing short run and long run effects. The estimated coefficients were unsatisfactory, as they were negative for MICs but positive and insignificant for LICs. For the real exchange rate, Oshikoya finds confirmation for the theory that this variable affects investment in opposite directions through different channels. MICs register a positive and significant impact, while LICs have a negative and insignificant impact. Overall, he finds that the lagged debt service ratio and inflation, public investment rates and real exchange rate have the most relative impact

on private investment in MICs whereas for LICs, credit availability, inflation, output growth rate and the debt service ratio had the largest impact.

3.3 SUMMARY

The review of literature reveals that the debate about the impact of positive real rates of interest on savings and investment is far from being concluded. There are good arguments on both sides. This calls for country specific studies that can analyse and provide answers on each country's experience with the financial liberalisation.

The next chapter covers the methodology of the study and adopts from the various studies discussed above. The McKinnon-Shaw financial liberalisation theory is the foundation of the methodology and adds those factors that are relevant to the Zambian situation and that can have an impact on savings and investment.

CHAPTER FOUR

THE METHODOLOGY OF THE STUDY

4.0 **INTRODUCTION**

After the review of theoretical and empirical literature in the previous chapter, the model for investigating Zambia's experience with financial policy can now be specified. This chapter presents the model that is used for estimation of the impact of financial policy on savings mobilisation and investment. In the first section the hypotheses are stated. The second section specifies the theoretical and empirical models for both savings and investment, while the third section explains the estimation technique. The last section explains the data used in the study.

4.1 **HYPOTHESES**

The following hypotheses will be tested by the study:

1. Financial liberalization, as evidenced by positive real interest rates, has lead to greater savings in Zambia.
2. Financial liberalization, as evidenced by positive real interest rates, has lead to increased investment in Zambia.

4.2 SPECIFICATION OF THE MODELS

The study draws from Fry's 1988 and 1995 models which are designed specifically for empirical testing. These studies are based on a macroeconomic model built around a system of five equations and they are very relevant to the developing country position as it includes the effects of foreign debt accumulation and foreign direct investment on saving and investment as well as the rate of growth of the economy. According to economic theory, saving and investment are jointly determined, therefore a simultaneous equation investigation is indicated. In LDCs, this does not hold as empirical studies have established that savings and investment variables are not the same and have been found to have different values. Arrieta (1988) states that "it is plausible to assume that a sample country has been on its savings function but not their investment function". Hence the study uses single equations to estimate the savings and investment equations.

The saving function is based on the life-cycle model. The standard life-cycle model has young, income earning households saving in order to finance their consumption when they are old and no longer earning any income. The lifetime resources of young savers exceed those of old dissavers. It assumes that each household consumes all its resources over its lifetime, therefore implying that growth in aggregate real income is positive. Even if there was no savings over a household's lifetime, there is still positive aggregate saving so long as there is positive growth in aggregate real income. This is called the rate-of-growth effect. The relationship between income and consumption over the lifespan of the household is the determinant of the rate-of-growth effect (Fry, 1998).

The investment function specified by Fry is based on the flexible accelerator model. However, institutional and data constraints among developing countries result in the unavailability of key data such as capital stock, return to capital and wages. Therefore the successful establishment of an empirical investment function based on the neoclassical flexible accelerator model has not been possible. The practice has been to *use some form of the accelerator model.*

4.2.1 **Savings equation**

Theoretical model

The savings equation is specified as follows:

SN= f (INCG, RD, RW, FDI, DET, DCGR, PS, SAUDI) (4.1)

The variables appearing in this equation and the investment equation are explained in Table 4.1. We now explain below the rationale for including the various explanatory variables in the savings equation.

The rate of growth in real income (INCG):

The inclusion of the rate of growth in real income is based on the life-cycle model that has young income earning households saving for the time when they will no longer be earning. The simple life-cycle assumes that all resources earned are consumed over a households lifetime. Therefore aggregate saving will be positive if there is positive growth in aggregate real income. INCG is expected to have a positive impact on savings.

Real interest rates (RD, RW):

The real deposit rate of interest, RD, is used as a proxy for the level of all real institutional interest rates. RW is the world real rate of interest. When RD rises there is a substitution away from consumption into deposits, and assuming that the substitution effect is greater than the income effect, savings rises as a RD increases. However, a rise in the world interest rate, RW, has a negative effect on savings if capital outflows are not completely controlled.

Foreign direct investment (FDI):

The model takes into account the importance of capital flows. The demand for foreign savings is determined by the gap between savings and investment in the domestic economy. The supply of foreign savings is determined by the world real interest rate RW plus a country specific risk premium which gives us the cost of borrowing internationally for that particular country. Foreign debt build-up, weak fiscal performance and macroeconomic mismanagement are other factors that are used in determining this premium. An inflow of foreign savings reduces the domestic interest rate and national savings. In addition foreign savings may increase consumption as it competes with and becomes a substitute for domestic savings.

The government may devalue the real exchange rate to make exports more attractive, and the entrepreneur is likely to respond to the incentives and increase his investment subject to investment supply (credit availability) constraints. The foreign direct investment ratio, FDI, has a negative relationship with savings only if the domestic investor transfers funds abroad through overinvoicing or underinvoicing and then

Table 4.1 Variables in the model and their definitions

DCGR = Net domestic credit to the government/total domestic credit; from IFS
DCP = Domestic credit to the private sector; from IFS
DET = Total external debt; World Debt Tables and Ministry of Finance
FDI = Net inflow of foreign direct investment; from Ministry of Finance and Zambia Investment Centre
IK = Domestic investment (domestic investment is gross fixed capital formation plus in stocks); from IFS
INCG = Rate of growth in real income, GNP; GNP/GNI sourced from IFS
RD = Real deposit rate of interest (12 month deposit rate of interest minus US inflation); sourced from Central Statistical Office and Ministry of Finance
REX = Real exchange rate; Central Statistical Office and IFS
RW = World real interest rate (6 month London Inter Bank Overnight Rate (LIBOR) deposit rate minus U.S. inflation); from IFS
SN =National savings (national savings is domestic investment plus current account balance); sourced from International Financial Statistics (hence IFS)
TOT = Terms of trade (export price index/import price index); World Debt Table
YG = Rate of growth in real output, GDP; from IFS
PS = Policy shift dummy variable
SAUDI =Dummy for openness of trade relations with South Africa and Zimbabwe (Rhodesia)

brings it back as FDI to take advantage of the better terms and conditions obtaining for FDI in comparison with locally financed investment. In Zambia the presence of multinationals and the drive to woo foreign investors could make FDI exert a negative influence via this conduit.

Governments foreign debt (DET):

The government foreign debt, DET, may have a positive or a negative impact on national savings rates. In its early stages foreign debt could induce the government to devalue the domestic currency to give incentives to exporting industries in order to raise export earnings. This devaluation would make the real returns on assets that are held abroad higher than the domestic assets, causing capital flight and a reduction in national savings.

On the other hand, an accumulation of foreign debt may, according to the Ricardian equivalence, cause private savings to rise as individuals see this build-up and anticipate that there will be higher taxation in the future to pay back the debt and hence they will increase their saving rate.

Government deficits and weak macroeconomic performance (DCGR):

Government deficits can have a positive effect on savings according to Ricardian equivalence hypothesis. When there is an increase in the budget deficit position, individuals tend to have expectations that the tax burden will be increased to reduce the deficit irrespective of whether this deficit is financed by higher lump-sum taxes or borrowings. Hence they will save to cushion the impact of the expected future increase in tax. Furthermore this increase in private saving can offset the loss in national savings due to the reduction in government saving. The Ricardian equivalence assumes a closed economy that is also characterized by lack of borrowing constraints. However in developing countries this assumption might not hold and we find that savings are

repatriated abroad since most economies are open and restrictions on capital movement can be easily circumvented. In addition, the liberalised financial system may lead to easier access to consumer credit, which may cause savings to decline. DCGR also proxies weak fiscal performance or macro-economic management. The rationale is that for a government to extract high seigniorage from the banking system it means they must be following other restrictive macro-economic policies as well. Therefore, the impact of DCGR can not be ascertained a priori.

All the independent variables in our theoretical model in Equation 4.1 are included in the econometric model specified in Equation 4.2. In addition, we include two qualitative variables (policy shift to financial liberalisation and openness of trade) which we believe influence savings ratios in Zambia. These are explained further below:

Policy change (PS):

Policy shift is represented by a dummy variable, PS. The shift to a financial liberalisation regime, where interest rates are allowed to attain their free market equilibrium, is expected to have a positive impact on savings. It takes a value of 1 for the years when the financial system was deregulated, 1985-1987, 1989-1990 and 1991-1996. It is 0 for all other years.

Trade restrictions (SAUDI):

This dummy captures the positive effects of open and unrestricted trade. It takes a value

of 0 for the years of trade embargoes and restrictions with South Africa and Zimbabwe (Rhodesia), 1965-1988 and 1 for all other years.

Empirical model

The empirical model for savings is stated in semi-logarithmic functional form for the reason that some of the regressors take negative values and hence cannot be expressed in logarithms.

The econometric model for savings is therefore specified as follows:

$$LSN = a_0 + a_1 INCG + a_2 RD + a_3 LRW + a_4 LDET + a_5 DCGR + a_6 LFDI + a_7 PS + a_8 SAUDI + U \quad (4.2)$$

where all the variables are as explained in Table 4.1, L is the logarithm operator, the "a"s are the parameters to be estimated and "U" is the error term. From the foregoing theoretical discussion we expect the coefficients in the model to have the following signs:

$a_0, a_1, a_2, a_7, a_8 > 0$;

$a_3 < 0$;

$a_4, a_5, a_6 > 0 \text{ or } < 0$;

The intercept a_0, is expected to be positive.

4.3.1 **Investment equation**

Theoretical model

The equation for investment is specified as follows:

$$IK = f(YG, TOT, RD, REX, RW, DCP, DCGR, DET, FDI, PS, SAUDI) \quad (4.3)$$

The variables in the model are also explained in the Table 4.1. Below we discuss the possible effects of the explanatory variables in the model:

The growth rate of output (YG):

This is the growth rate of real output. It is expected to have a positive impact on investment.

The terms of trade (TOT):

TOT is the terms-of-trade. The terms of trade improvements can have a negative or positive effect on investment. Here a permanent improvement in the terms-of-trade raises the investment ratio by increasing the returns to capital. Temporary improvements in the terms of trade have a negative impact on investment as companies tend to run down inventories for the sake of making good profits at the high, though temporary, relative price of exports.

Real interest rate (RD):

The real deposit rate of interest is expected to have a positive impact on investment. The deposit rate of interest then acts as an inverse proxy for the real loan rate and should

have a positive impact on investment (Fry, 1988). When there is financial repression, the effective real loan rate would decline as the real deposit rate rises (see Figure1.1 in Chapter One). The lower the real deposit rate, the smaller the volume of saving and hence the higher the market clearing loan rate of interest.

Credit availability (DCP):

Credit availability is proxied by the log of domestic credit to the private sector, DCP. When an economy is financially repressed the real deposit rate of interest affects investment through the credit availability mechanism. There is a positive relationship between the availability of credit, and investment. A rise in the deposit rate of interest towards its free-market equilibrium level will increase the supply of DCP in real terms and thus stimulate investment.

Cost of production (REX):

The real exchange rate, (REX) is a proxy for the price of tradable goods in relation to the price of non-tradable goods, and it captures the effect of the relative price of intermediate goods used in production on investment. The real exchange rate is defined thus:

$$REX = PF / PD * E \qquad (4.4)$$

where PF is the foreign price level, PD is the domestic price level and E is the nominal exchange rate, defined as the quantity of local currency per one unit of foreign currency. When the REX rises or there is a depreciation of the real exchange rate, imports become relatively expensive thereby decreasing investment. On the hand the government may

devalue the exchange rate to increase the countries foreign exchange earnings. This would make exports more attractive on the international market, and the local entrepreneur is likely to respond to the incentives and increase investment in exporting projects, subject to investment supply (credit availability) constraints. The increasing number of non-traditional export (NTE) projects in Zambia could make the impact of this variable positive. REX may therefore prove a poor proxy.

The cost of capital (RW):

The world real interest rate captures the effect of competing assets in other countries and is proxied by the 6-month London Inter Bank Offer Rate (LIBOR) deposit rate minus U.S.A. inflation rate. A rise in the world real interest rate, RW would lead to an outflow of domestic deposits. An increase in RW affects the domestic investment negatively as long as international capital mobility is not prevented.

Uncertainty, risk and instability (DCGR):

The ratio of public or government credit to total domestic credit, DCGR is a proxy for Zambia's macroeconomic mismanagement, policy instability and uncertainty, which have a negative impact on investment. However, government expenditure may crowd in private investment and result in a positive impact on aggregate investment. We cannot ascertain its impact a priori.

Foreign indebtedness(DET) and Foreign direct investment (FDI):

Debt servicing implies additional future tax burden for companies and individuals, or if it is financed by inflationary methods, results in higher prices and increased costs, which affect investment negatively. Foreign indebtedness, (DET) also reduces the expected net return to domestic investment or it may reflect a higher cost of investible funds and therefore have a negative impact on investment. It can also act as a proxy for the country-specific risk premium. Foreign direct investment (FDI) can increase the investment ratio in an economy if it is an addition to and is not a substitute for foreign borrowing. Hence it is difficult to ascertain its impact a priori.

This equation also includes the dummy variables, PS and SAUDI that have been explained earlier. They are all expected to have a positive impact on investment.

Empirical model

The econometric model for investment is therefore specified as follows:

$$LIK = b_0 + b_1 YG + b_2 TOT + b_3 LDCP + b_4 LREX + b_5 LRW + b_6 DCGR + b_7 LDET + b_8 LFDI + b_9 RD + b_{10} PS + b_{11} SAUDI + U \quad (4.5)$$

where all the variables are as explained in Table 4.1, L is the log operator, the" U" is the error term and the "b"s are the parameters to be estimated. From the foregoing theoretical discussion we expect the coefficients to have the following signs:

$b_0, b_1, b_3, b_9, b_{10}, b_{11} > 0$

$b_5, b_7 < 0$

$b_2, b_4, b_6, b_8 > \text{or} < 0$

The intercept b_0, is expected to be positive.

4.3 ESTIMATION TECHNIQUE

As the study is dealing with the modelling of macroeconomic time series, it is appropriate that cointegration estimation technique is used to estimate the two equations. The following sections explain in detail the cointegration estimation technique.

4.3.1. **Analysis of the order of integration**

Traditional econometric practice assumes that economic time series are stationary with a mean and variance being 0 and σ^2 respectively (Atta, Jeffris, Mnanathako, 1996, Charemza, Deadman, 1992, Wood, 1995). In practice this is not the case because we find that with most time series the mean and the variance are not constant or in other words the variables are non-stationary. Hence the regression results using non-stationary variables are spurious. By spurious we mean the misleading results obtained when a trended, non-stationary economic time series is regressed on another one.

To obtain valid estimation and inference we need a set of non-stationary variables to be cointegrated, i.e. there must exist a linear combination of these variables that is stationary. Such cointegrated variables can then be interpreted as forming a long-run equilibrium relationship. Hence we can specify a corresponding error correction or dynamic equation for these variables as postulated by the Granger Representation Theorem. The error correction model (ECM), uses both levels and differences and is

compatible with long-run equilibrium behaviour where the variables in levels are represented by an error term.

The Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) test procedure are often used to test for the nonstationarity of a series or the existence of a unit root. This study uses the ADF test which involves running a regression of the first differences of the series against the series lagged once, lagged difference terms, and optionally, a constant and a time trend. A large negative *t*-statistic for the coefficient of the one lag variable rejects the hypothesis of a unit root and suggests that the series is stationary. Under the null hypothesis of a unit root, the reported t-statistic does not have the standard t-distribution and therefore requires reference to the critical values presented in the test output. For the Econometrics package that has been used for this study, Eviews, the Mackinnon critical values are reported.

The Eviews package expresses the DF regression as an autoregressive process of order one, AR(1), of the form:

$$\Delta y_t = u + \rho y_{t-1} + \varepsilon_t \qquad (4.6)$$

where y_t is the time series, u and ρ are parameters, ε_t is an error term. The lag length is set to ensure autocorrelation is absorbed. The error term is assumed to be independently and identically distributed with zero mean and constant variance. The AR(1) process is stationary if $-1<\rho<1$. If $\rho=1$ the equation defines a random walk with drift and y is

then non-stationary. If the process started at some specific point, the variance of y increases steadily with time and the unconditional variance is infinite, giving us an explosive series if the absolute value of ρ is greater than one. Hence the crucial null hypothesis for testing nonstationarity is that the absolute value of ρ equals one. If the ADF statistic is smaller in absolute value than the reported critical values you cannot reject the hypothesis of nonstationarity and the existence of a unit root. You would conclude that the series is not stationary. This means that you would need to difference the series at least once to make it stationary. In terms of their order of integration, a series is said to be integrated of order d if it becomes stationary after differencing d times. Such a series is denoted $x_t \sim I(d)$. A stationary series is an I(0) series and a series that needs to be differenced once to make it stationary is therefore an I(1) series (Adam,1992).

4.3.2. **Cointegration and error correction model**

The next step is to conduct cointegration analysis in order to test for the long-run relationships among the variables in the equation.

According to Adam (1992), a group of non-stationary time series is cointegrated if there exists a linear combinations of them that is stationary, that is the combination does not have a stochastic trend. This linear combination is called a cointegrating equation that is interpreted as a long-run equilibrium relationship. Cointegration provides a discriminatory test for spurious correlation. Conducting cointegration analysis between

apparently correlated I(1) series and finding cointegration validates the regression. Failing to find cointegration is an indication that spurious correlation may be present thereby invalidating any inference drawn from such correlation. In addition cointegration analysis outperforms other empirical models such as the partial adjustment mechanism. The partial adjustment models face serious problems when the data series are non-stationary. They experience multi-collinearity, exhibit high levels of first order autocorrelation, and generally fail to capture structural characteristics between the explanatory dependant variables.

The Engle and Granger Representation theorem (Adam, 1992) states that if two series are cointegrated they will be most efficiently represented by an error correction specification and furthermore this dynamic error correction specification will encompass any other dynamic representation, including the partial adjustment model. The error correction parameterisation of the autoregressive distributed lag model (ADL) takes the form:

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta z_t - \alpha_2 (y - kz)_{t-1} + \varepsilon_t \qquad (4.7)$$

where k is the long-run proportionality between x and y.

The ECM relates the short-run change in the dependant variable Δy to the short-run change in the explanatory variable Δz. This is called the impact effect. It ties the change to the long-run proportionality between y and z, the long-run effect, through a feedback mechanism. In doing so it allows us to exploit information on the equilibrium

relationship between non-stationary series (if such equilibrium exists) within a stationary and therefore statistically consistent model. In the ECM we have a combination of long run and short-run information in the same model (Adam, 1992).

For non-stationary data, the ECM transforms the series and does away with the problem of multi-collinearity, which are common in partial adjustment models. The ECM does not impose the restrictive lag structure as does the partial adjustment model and will also ensure the same order of integration i.e. I(0) of the variables.

For this study the Johansen Maximum Likelihood method for multivariate cointegration analysis is used. According to Doornik and Hendry (1994) and Engle, Hall et al, (1994), Johansen defines a general polynomial distributed lag model as:

$$X_t = \alpha_1 X_{t-1} + \ldots\ldots\ldots + \alpha_k X_{t-k} + \mu_t \qquad (4.8)$$

where X_t is a vector of N variables of interest, μ_t is a white noise error term and t=1, ..., k. Therefore if we have N endogenous variables, each of which is first-order integrated, there can be from zero to N-1 linearly independent cointegrating vectors. The Johansen Maximum Likelihood test determines the number of distinct cointegrating equations that exist among the variables of X, called the cointegrating rank. The cointegration relationships are estimated as the eigen vector corresponding to r non-zero eigen values. The magnitude of eigen value is a measure of how strongly the cointegration relation is correlated with linear combinations of the stationary process. The likelihood ratio test distinguishes non-zero from zero or the largest eigen values. If

the likelihood ratio exceeds the critical value then we can accept the alternative hypothesis that there are at most n cointegration vectors. We can then proceed to obtain normalised cointegrating equations and carry out the general-to-specific modeling to arrive at our parsimonious equation.

In addition, the study will carry out diagnostic tests to ensure that the results are consistent with economic theory and reality.

4.4 **DATA**

In this section we look at the data that were used in the study. The sources of the data and the limitations are also noted.

4.4.1 **Data sources**

We used secondary data from the following sources:

- The World Tables which are published by the World Bank
- Government Finance Statistics Yearbook and the International Financial Statistics Yearbooks published by the International Monetary Fund.
- Various publications of the Central Statistical Office, the Bank of Zambia and Zambia Investment Centre as indicated in the bibliography.

4.4.2 **Data limitations**

Annual data are used due to lack of availability of high frequency data especially on

GDP, and investment.[7]This has invariably limited the number of observations to 32 from the time that Zambia became independent in 1964 to 1996, the year in which the study period ends.

The measurement of investment and savings data in developing countries is fraught with problems. For instance, saving and investment might be under-estimated since purchases of consumer durables are treated as consumption rather than as investment. The same is true for expenditures on those components of human capital investment such as education and health. Capital flight problems lead to under-estimation of external savings. This is because of the capital flight that goes unrecorded or in under-reporting of net exports. As a result, gross domestic savings are lower or gross investment is over reported, or both (Schmidt-Hebbel, Serven and Solimano, 1996).

Data on capital consumption or depreciation allowances is also lacking. The public sector capital expenditure is treated as government consumption. This leads to an underestimation of capital formation figures, and that is the rational for using gross investment instead of net investment as a measurement of investment.

For some series, there is no data available especially for the years just after independence. One good example is data for foreign direct investment that is only

[7]High frequency data has however, recently become available following the work done on interpolation of Zambia's GDP data by Atta (1998c). We are unable to make use of the quarterly data for GDP, since qarterly data for investment and national savings is not available.

available from 1970, although the value for 1971 is missing. This has meant that this variable can only be used in a smaller sub-sample of 1972-1996. Other limitations are the "reservations expressed about the reliability of data generated especially by the Central Statistical Office" (Directorate of Macroeconomic Policy Analysis, 1997, p. iv), a view held by the major macroeconomic analysts and researchers in Zambia.

4.5 SUMMARY

The chapter discussed the methodology that the study uses. The equations are based on Fry's study of the McKinnon-Shaw financial liberalisation theory. The methodology drew from the previous three chapters and modeled the equations for savings and investment on the Zambian economy. This necessitated the inclusion variables that were expected to have an impact on the dependant variable and exclusion of variables that were not relevant to the Zambian situation. Two dummy variables were included in the equations.

As the models have been specified, the next step is to estimate the models. The following chapter explains the model estimation and gives the results of the estimation.

CHAPTER FIVE

MODEL ESTIMATION

5.0 **INTRODUCTION**

This chapter focuses on the analysis of the empirical estimates of the savings and investment equations developed in the previous chapter in order to explain the impact of financial liberalization, as evidenced by positive real interest rates, on savings and investment.

The dependent variable for the savings equation is national savings and the explanatory variables are the domestic real interest rate, world real rate of interest, foreign indebtedness, growth rate of income, foreign direct investment, domestic credit to the government, as well as dummies for policy shift and openness of trade with South Africa and Zimbabwe (formerly Rhodesia). For the investment equation, investment is the dependent variable and the explanatory variables are the domestic real interest rate, domestic credit to the private sector, world real rate of interest, foreign indebtedness, growth rate of output, the real exchange rate, the terms of trade, foreign direct investment, domestic credit to the government, well as the two dummy variables.

e rest of the chapter is organised as follows: the next section looks at the time series properties of the variables, while section 5.2 discusses the cointegration analysis. Section 5.3 covers the dynamic analysis and Section 5.4 the structural stability tests. The chapter closes with a summary of the results.

5.1 TIME SERIES PROPERTIES

The first step is to establish the order of integration of the variables of interest by employing unit root tests of all variables, with the exception of the dummy variables PS and SAUDI. The Augmented Dickey-Fuller (ADF) Test is used. The null hypothesis of

Table 5.1 Time Series Properties at 5% Critical Value

Variable	ADF TEST-Levels	LM TEST for serial correlation in ADF	No. of lags in ADF	Order of integration
DCGR	-4.261166**	F=1.9386 (0.1667)	2	I(0)
LDCP	2.5690	F=0.3170 (0.7310)	0	I(1)
ΔLDCP	3.5600**	F=0.4621 (0.6351)	0	I(0)
LDET	2.1954	F=0.0928 (0.4125)	6	I(1)
ΔLDET	4.6867**	F=0.1892 (0.8287)	0	I(0)
LFDI	-3.2562*	F=1.8395 (0.1847)	0	I(0)
LIK	2.3402	F=0.0764 (0.9266)	0	I(1)
ΔLIK	4.3042**	F=0.5774 (0.5684)	0	I(0)
INCG	-3.9783**	F=0.6748 (0.5199)	3	I(0)
RD	-4.7649**	F=0.3130 (0.7354)	5	I(0)
LREX	-1.9863	F=0.7618 (0.4762)	1	I(1)
ΔLREX	4.9230**	F=6478 (0.5314)	0	I(0)
LRW	-2.4501	F=2.9981 (0.0667)	6	I(1)
ΔLRW	3.4571*	F=0.6215 (0.5455)	3	I(0)
LSN	2.0513	F=1.9463 (0.1656)	1	I(1)
ΔLSN	-8.3254**	F=0.8050 (0.4579)	0	I(0)
LTOT	0.7217	F=0.0428 (0.9582)	3	I(1)
ΔLTOT	6.7005**	F=0.0218 (0.9785)	1	I(0)

YG	7.2576**	F=0.5574 (0.5794)	0	I(0)

Note: Critical values: Levels I (0) = -2.963; and First differences I (1) = -2.971

this test is that of a unit root (I(1)). An insignificant test statistic would mean that we could not reject the null hypothesis of non-stationarity. This implies that the series is non-stationary and needs to be differenced at least once to make it stationary. The strategy followed in selecting lag length in the ADF test is to select the highest lag length with a significant last lag. Table 5.1 shows the results of the ADF test at the 5% significance level with an intercept and no trend. The series on LSN, LRW, LDET are I(1) and can therefore be included in the savings cointegration analysis. Also the series on LDCP, LDET, LIK, LRW, LTOT and LREX are all I(1) and are thus valid for inclusion in the investment cointegration analysis. The series INCG, DCGR, RD, LFDI and YG are I(0).

5.2 **COINTEGRATION ANALYSIS**

The next step is to determine the cointegrating equations by use of the Johansen Maximum Likelihood procedure.

5.2.1 **Savings equation**

For savings, an equation with a constant and no deterministic trend was used (see Equation 4.2). The variables included in the cointegrating equation were all the variables that are I(1), namely LSN, LRW and LDET, while the two dummy variables were also

excluded. The results for the savings equation, as reported in Table 5.2 and Appendix A show that at 5% critical value, we reject the null hypothesis of no cointegration and accept the alternative that there is at most one cointegrating equation. The analysis of the normalised coefficients of the cointegrating equation in Appendix A gives the following cointegrating equation which is consistent with economic theory:

$$LSN = 3.499337 - 1.239175LRW + 0.681306LDET \qquad (5.1)$$

These results confirm a long-run relationship between national savings and the world real rate of interest, RW and foreign debt, DET. When significance tests are carried out by computing "t" test, all the variables are significant. Regarding the intensity of the savings effects, results show that a 1 per cent increase in the world real rate of interest leads to a 1.24 percent decrease in national savings. Equally a 1.00 percent increase in foreign debt leads to a 0.68 percent increase in the national savings.

Table 5.2 Cointegration Test for the Savings Model

Null	Alternative	Likelihood Ratio	Critical Value (5 per cent)
r=0	r=1	37.83	34.91
r=1	r=2	16.73	19.96
r=2	r=3	4.68	9.24

5.2.2 **Investment equation**

The variables included in the cointegrating equation are all the I(1) variables, namely LIK, LDET, LRW, LDCP, LREX and LTOT. The two dummy variables are excluded. Equation 4.5 was employed to analyse the cointegrating relationship between investment and its explanatory variables. According to Table 5.3 the likelihood ratio test that there is at most zero cointegrating vectors was rejected. There are five cointegrating vectors. The analysis of the normalised coefficients of the cointegrating equation in Appendix A gives the following cointegrating equation which is consistent with economic theory:

$$LIK = -9.933043 - 0.811585LDET + 2.415986LDCP + 0.119561LRW + 1.018060LREX + 1.413082LTOT \quad (5.2)$$

The results confirm the long-run relationship between investment and foreign debt, DET, the world real rate of interest, RW, domestic credit to the private sector, DCP, the terms of trade, LTOT and REX, the real exchange rate. When significance tests are carried out by computing "t" test, all the variables are significant except for RW. Regarding the intensity of the investment effects, results show that investment is very sensitive to the supply of credit to the private sector. The coefficient here is positive, implying that investment increases by 2.41 percent when domestic credit to the private sector goes up by 1 percent.

An increase in the real exchange rate or a depreciation of the nominal exchange rate makes domestic exports cheaper and therefore more attractive on the world market. Export companies react by increasing their investments. An increase in the real

exchange rate of a 1.00 percent results in a rise in investment of 1.07 percent. Foreign debt has a negative impact on investment. A 1.00 percent increase in foreign debt leads to a 0.81 percent decline in investment. The impact of a rise in the terms of trade on investment is positive.

These results form a solid foundation upon which the error correction terms ECMSAV and ECMIK, are incorporated into a dynamic error correction framework for the savings and investment equation respectively.

Table 5.3 Cointegrating Test for the Investment Model

Null	Alternative	Likelihood Ratio	Critical Value (5 per cent)
r=0	r=1	181.41	102.14
r=1	r=2	126.72	76.07
r=2	r=3	80.25	53.12
r=3	r=4	45.11	34.91
r=4	r=5	21.37	19.96
r=5	r=6	5.36	9.24

5.3 **DYNAMIC ANALYSIS**

The next step after having established the extent and form of the cointegrating relationship among variables of the models is to estimate over-parameterised error correction models for each of the two equations. The study begins by estimating general

or unrestricted models (Appendix B). All the I(0) and I(1) variables, the dummies and constant are included in this estimation making sure that the first difference of the I(1) variables are used. Due to the small size of the sample data, which is annual and the large number of variables, we use a lag of 1 to obtain sufficient degrees of freedom. The reported results include coefficient estimates, t-values, probabilities and other relevant tests. The model is then sequentially simplified by the elimination of insignificant variables based on their probability and t-ratios as well as economic considerations. The Schwarz Information Criteria (SC) and Akaike Information Criteria (AC) are used as guidelines. As the information criterion becomes more negative, it means that the model is improving. The procedure gives rise to the parsimonious model (that is, a model with fewer but significant variables) that are presented in Table 5.4 and Table 5.5.

5.3.1 **Savings equation**

Table 5.4 gives a summary of the output of the parsimonious savings model, with a full output given in Appendix C. The 'D' preceding a bracketed variable represents first difference while 'L' represents logarithms. The number –1, in the inner brackets for any variable represents a 1 period lag. As earlier stated this is equivalent to one year for our study. ECMSAV(-1) is the error correction term lagged one period.

To establish the statistical attributes of the parsimonious model, several diagnostic tests were performed. The OLS classical assumptions of normality (A), the first and higher order serial correlation of the residuals (B), heteroscedasticity (C), and the regression specification test (D), were not violated at the 5 per cent level of significance (see also

Appendix C). The omitted variable F-test shows that the omission of the domestic real rate of interest is acceptable, implying that the variable is not important in explaining the variation in national savings.

The discussion of the empirical estimates starts by evaluating the goodness of fit, adjusted R^2 and the t-statistics. By explaining about 75 per cent of the variations in national savings, the savings equation in Table 5.4 does a good job of modeling the short-run national savings function. The coefficients of the variables indicate the short-run influences. The signs of the estimated model generally conform to a-priori

Table 5.4 National Savings, modeling D(LSN) by OLS

Variable (Lag)	Coefficient	T-Statistic	Probability
Constant	0.423	3.802	0.001
INCG(-1)	0.018	2.573	0.019
D(LRW)	-1.352	-3.050	0.007
LFDI(-1)	-0.442	-2.871	0.010
ECMSAV(-1)	-0.557	- 3.349	0.004
Adj. R^2=0.75	Se= 0.51	F=13.69	SC=-0.91

Diagnostic Tests

A: F=1.20(0.55)	B:F=1.33(0.26) B1:F=0.24(0.63)	C:F=0.29(0.96)	D:F=0.)

Note: A: Jaque-Bera test for Non-normality in error distribution
B: Breusch-Godfrey LaGrange Multiplier tests for Serial Correlation
B1:ARCH LaGrange Multiplier tests for Auto Regressive Conditional Heteroscedasticity

C: White's Heteroscedasticity test
D: Ramsey's RESET test for functional form Mis-specification

expectations. The coefficient of the first lag of the growth rate of real income is correctly signed and is statistically significant at the 5% level of significance, lending support to the McKinnon-Shaw hypothesis of a positive impact of the growth rate of income on savings. In addition it lends support to consumption theories and Keynesian theory which have found real income an important determinant of savings. The first difference of the log of the world real rate of interest is correctly signed. It is negative and statistically significant. The log of the foreign direct investment lagged one period is also negatively signed and is significant. This confirms a priori expectations that FDI has a detrimental impact on national savings. The domestic real deposit rate of interest was dropped early in the modeling, as it was statistically insignificant and surprisingly negative. This is in direct contrast to the McKinnon-Shaw financial liberalisation theory and complementarity hypothesis, which state that high real interest rates are an important determinant of savings.

An increase in the growth rate of real income leads to increases in national savings after one period, and a similar increase in domestic credit to the government leads to a rise in national savings. A unit increase in the world real rate of interest results in a 1.35 unit decrease in national savings.

None of the three dummy variables is statistically significant. The policy shift dummy, PS, does not conform to a priori expectations, as the negative coefficient is insignificant.

The other dummy for opening up of trade to South Africa and Zimbabwe has similarly not had any significant effect on national savings.

Another important aspect is whether the long-run relationship has a statistically significant impact on the short-run dynamics. The error correction term, ECMSAV, has a negative and highly statistically significant coefficient. The error correction term estimates the feedback in the current period from last year's disequilibrium in the long-run relationship of national savings and the domestic real rate of interest, world real interest rate and the debt. The result suggests that a 56 per cent of the previous years disequilibrium from the long-run national savings equation feeds back into current national saving. The dynamic structure of the model suggests that the adjustment towards long run equilibrium takes only one period, i.e. 1 year.

In the above estimations the short-run and long-run analyses lend little support for McKinnon-Shaw financial repression hypothesis. The higher real interest rates of the years 1992-1996 have not lead to increased savings. The shift to a regime of financial liberalisation has not had a significant impact on savings either.

5.3.2 **Investment model**

Table 5.5 below gives a summary of the parsimonious investment model, with a full output given in the Appendix C. The D preceding a variable represents first difference while L represents logarithms. The number –1, in the inner brackets for any variable

represents a 1 period lag. As earlier stated this is equivalent to one year for our study. ECMIK(-1) is the error correction term lagged one period.

In terms of the goodness of fit, the investment equation in Table 5.5 explains about 66 per cent of the variations in investment. The coefficient of the real domestic interest rate is statistically significant but is unexpectedly negative. A one per cent increase in the domestic real interest rate leads to a 0.01 per cent decrease in investment, thereby refuting the McKinnon-Shaw theory. The sign of the coefficients for the real

Table 5.5 Investment Quantity, modeling D(LIK) by OLS

Variable (Lag)	Coefficient	T-Statistic	Probability
Constant	-0.010	-0.151	0.881
YG	0.022	1.685	0.105
RD(-1)	-0.008	-5.287	0.000
D(LREX)	0.445	2.124	0.044
D(LREX(-1))	0.316	1.585	0.126
ECMIK(-1)	-0.155	-1.739	0.095
Adj. R^2=0.66	Se=0.27	F=9.42(0.000)	SC=-2.16

Diagnostic Tests

A: F=0.490(0.783)	B: F=1.675(0.208) B1:F=1.178(0.287)	C: F=1.78(0.287)	D: F=0.985(0.488)

exchange rate could not be ascertained a-priori. In the estimation, both the current and previous periods real exchange rate have a positive sign, although only the former is statistically significant. A 1.00 percent increase in the contemporaneous real exchange rate results in 0.44 percent increase in investment. This lends support to the Mundell-Fleming argument that depreciation of the exchange rate makes exports competitive and encourages investment in non-traditional exports. This is in contrast to the view that such depreciation makes imported intermediate and capital goods more expensive, thereby discouraging investment.

The error correction term, ECMIK, is correctly signed (negative) but is not statistically significant at the 5% confidence level. The coefficient on this term shows that about 15 per cent of last years disequilibrium from the long-run investment relationship feeds back into current investment.

The variables that were found to be insignificant in the explanation of short-run variations in the investment are the growth rate of output, credit availability, the terms of trade, domestic credit to the government, foreign debt build-up, foreign direct investment and the world real rate of interest. Domestic credit to the government has surprisingly not been significant. This could be explained by the fact that this credit funds unproductive investment. The unimportance of the credit availability in explaining variations in investment refutes the McKinnon-Shaw theory's assertion that when an economy is repressed the real deposit rate of interest will not affect investment directly

but via the credit availability mechanism. In the estimation, the highly significant real deposit rate-effect proves that it does work directly to influence variations in investment.

None of the three dummy variables is important in explaining the variation in investment. The results show the lack of effectiveness of the SAP-recommended policy shift to a liberalised regime, in influencing investment positively.

The results of the standard diagnostic tests for both the savings and investment equations show that the OLS classical assumptions of absence of non-normality (A), the first and higher order serial correlation in residuals (B), heteroscedasticity (C), and functional form mis-specification (D) were not violated at 5 per cent level of significance (Appendix C). The results suggest that the residuals are normally distributed, homoscedastic and serially uncorrelated. The omitted variable F-test shows that the omission of the terms of trade, credit availability and the world real rate of interest is acceptable, implying that these variables are not important in explaining the short-run variations in the investment ratio.

5.4 STRUCTURAL STABILITY ANALYSIS

The finding of existence of a cointegration relationship leads to the acceptance of stability in the long-run savings and investment equations. This is because the residuals from a cointegrating equation are required to be of a lower order of integration (i.e., I(0)) than that of the variables involved in the relationship, which should be I(1). The model satisfies this condition. Therefore our attention is focussed on the short-run savings

and investment equations. Due to the relatively small number of observations in the model, recursive stability tests were performed on the full sample.

For all the coefficients together, the plot of the recursive residuals based on the Chow tests (Fig. 5.1 and 5.2 for the savings model and Fig. 5.3 and 5.4 for the investment quantity model) show that at no point was the one period equation error statistically significant. In the absence of any structural breaks, the forecast errors should be close to zero, and 95% of such errors should lie within the band delineated by two standard errors. The residuals of the two models lie within the band delineated by two estimated errors ($\pm$2 SE). The plots of cumulative sum of recursive residuals, CUSUM and the cumulative sum of squared recursive residuals, CUSUM SQ, give no evidence of structural breaks, as the cumulative sum does not go outside the area between the two 5 per cent critical lines.

In conclusion, we can say that the savings and investment error correction models are relatively stable and do a good job of explaining changes in national savings and investment quantity.

5.5 **SUMMARY**

This chapter at the empirical estimates of the savings and investment equations which were developed on the basis of Fry's models of the McKinnon-Shaw financial liberalisation theory, with adaptations to suit the Zambian economic reality.

Cointegration estimation technique was used and involved the establishment of time series properties, the carrying it of the cointegrating analysis which resulted in long run equations. The error correction terms from this were incorporated into dynamic analyses which resulted, after elimination of insignificant variables, in short-run parsimonious models.

The McKinnon-Shaw financial liberalisation theory finds little support where the savings model in concerned, but has found support in the investment equation. The domestic real deposit rate of interest has not had any impact on savings and the shift to a regime of financial liberalisation has similarly not been effective in raising savings. For the investment model credit availability has had a positive impact on investment.

The next chapter, Chapter 6 summarizes the results and makes policy recommendations based on these results.

CHAPTER SIX

CONCLUSION AND POLICY RECOMMENDATIONS

6.0 **INTRODUCTION**

This study was motivated by the fact that a lot of the studies done on financial policy and its impact on savings and investment have used the cross-country approach, giving results which are at best generalisations of each country's experiences. There was therefore a need to carry out a country-specific investigation on Zambia to find empirical support for the McKinnon-Shaw hypothesis.

The McKinnon-Shaw hypothesis postulates that the liberalisation of all institutional interest rates in an economy to allow them to attain their free-market equilibrium levels will result in increased savings mobilisation and lead to an increase in investment. McKinnon has emphasised the importance of the complementarity between money and physical capital, with positive real interest rates as a return to savers. His model assumes that investment expenditures are lumpy and indivisible and agents are restricted to self-financed investment there is a need to accumulate savings. Shaw's debt intermediation view emphasises that higher real institutional interest rates will enhance financial intermediation between savers and investors. Positive real interest rates play an important role in the deposit accumulation that is necessary to enhance the lending

capabilities of financial institutions. Here too the positive real rate of interest is key as it will encourage savings that will increase the amount of credit available to finance investment. Under the liberalised financial conditions only profitable investments are accommodated. Therefore both the quantity and quality of investment improves under this liberalised regime.

There is still a lot of debate about the interest rate elasticity of savings and investment. Critics argue that financial reform leads to a one-time reallocation of productive factors and it is erroneous to assume that the raising of the economic growth rate, savings and investment will be medium or long term. The study set out to validate the McKinnon-Shaw hypothesis by examining the trends of savings and investment in Zambia and by establishing if financial liberalisation has had a positive impact on savings and investment. Finally the study makes policy recommendations for the enhanced working of financial liberalisation policy in Zambia.

6.1 **FINDINGS**

The results of the cointegration analysis are summarised under two appropriate headings.

6.1.1 **Savings**

The first hypothesis was to verify whether positive real interest rates have led to increased savings in Zambia. In terms of a long-run relationship the study established that national savings does not have any long-run relationship with real interest rates.

This could be as a result of inflation levels that have been high and kept the real rate of interest highly negative and therefore unattractive to savers for much of the period under study. Aggregate data on savings has been used and the lack of response could be due to the inclusion of government savings that are largely unresponsive to changes in interest rates. Comparatively, empirical studies show financial savings to be more responsive to positive real interest rates. In the short run also, interest rates do not have any influence on national savings. The shift to a policy of financial liberalisation has not had any significant impact on national savings. Again this could be explained by high inflation that has kept the return to savers negative despite the high nominal interest rates. Other factors are the Treasury Bills that attracted a lot of funds from the deposit accounts of commercial banks as well as the commercial banks own excessive liquidity preference especially in the period after 1992.

Interpretation of the coefficients of the error correction term in the savings equation highlights the fact that 55 per cent of disequilibrium from the previous year, feeds back into the current year. The variables which have a long-run relationship with national savings are the world real rate of interest, that has a negative influence, and foreign indebtedness that has a positive impact. In fact the world real interest rate is the only variable that has a negative influence on national savings in both the long and short-run, highlighting the fact that Zambia is responsive to the world market for savings despite the foreign exchange controls. The foreign opportunity cost of holding money has a long run impact on savings, therefore suggesting that there is substitution between domestic and foreign money in money holders asset portfolios (Mutoti, 1998). This substitution

may be more prevalent in the period after 1993 as a result of the removal of exchange controls and the holding of foreign exchange accounts by nationals. The positive impact of external debt in the long run lends support to Ricardian equivalence theorem in Zambia.

In the short-run, the growth rate of real income lagged one period has a positive and statistically significant effect on national savings thereby supporting the life-cycle hypothesis. Foreign direct investment has a negative and statistically significant effect on national savings, which may be as a result of increased consumption because the inflow competes with and becomes a substitute for national savings. An additional factor could well be the likely transfer of funds out of Zambia by multinational via over- and under-invoicing, only to bring it back as FDI in order to take advantage of tax and other incentives that FDI enjoys.

Therefore the study concludes that in terms of savings mobilisation, the McKinnon-Shaw hypothesis has found little support in Zambia, as positive real interest rates have not had any positive influence on national savings.

6.2.2 **Investment**

The second hypothesis was to verify whether financial liberalisation has had a impact on the level of investment in Zambia. The study has established that in the long run there is a positive relationship between investment and credit availability, foreign interest rate, the terms of trade and the real exchange rate, and a negative relationship between

foreign debt build-up and investment. In the short-run, investment has a positive relationship with growth rate of output and the real exchange rate, and a negative relationship with domestic real interest rates.

In the long run, the variables that affect investment are credit availability, world real interest rate, the external debt, the real exchange rate and the terms of trade. The real interest rate has no impact on investment in the long run. This supports Shaw's debt intermediation theory that it is not the real interest rate per se that will increase investment but rather the increased supply of credit as a result of improved financial intermediation that directly goes to raise investment.

The external debt has negative impact on investment in the long-run but has no short-run influences. Increasing debt service uses up public funds that could have gone to finance government expenditure as well as reduces incentives and resources available to private sector investment. Improvements in the terms of trade have a positive impact on investment, in the long run only. The raising of investment means that the improvements in the terms of trade are permanent and that this beneficial change has increased the returns to capital as postulated by Persson and Svensson.

The exchange rate has a positive impact in both the short and long run, lending strong support to the argument that a depreciation or devaluation of the local currency makes exports attractive on the world market. It implies more revenues in Kwacha terms for

exporters. There has been a marked increase in investment in non-traditional exports as a result of this.

The coefficient of the error correction term is correctly signed but is only statistically significant at the 10 per cent level. The error correction term estimates the feedback in the current period from last year's disequilibrium from the long-run investment relationship.

The growth rate of output has a positive impact in the short-run on investment only at the 10 per cent level of significance. It lends support, albeit weak, to financial liberalisation theory's argument of the benefits to investment associated with positive output growth rates.

None of the dummy variables have any impact on investment. The proximity of the markets in Southern Africa and their favourable exchange rate combined with the influx of investors to Zambia wishing to take advantage of the newly opened up economy, has not had a positive effect on investment. The shift to a liberalised financial policy itself has not had any significant effect on investment. This highlights McKinnon's later recommendation that financial liberalisation has to be accompanied by liberalisation of trade, fiscal reform and as well as other reforms in order to succeed.

The study therefore concludes in terms of the investment, the McKinnon-Shaw

hypothesis has found support as the strong and positive effect of credit availability on investment has been established

6.3 **POLICY RECOMMENDATIONS**

In the light of the conclusions reached, the study makes the following policy recommendations: -

1. The sequencing and speed or rate of reforms in the process of liberalisation is crucial to the successful attainment of the intended goals. In particular is the need to achieve macroeconomic stability before interest rates can be deregulated. Overvalued exchange currencies, unstable exchange rates and fiscal deficits need to be addressed. Before stability is achieved it may be wise to fix the domestic interest rates on bank deposits at a rate slightly above the inflation rate.
2. The results also show that a policy that encourages financial intermediaries in lending to the private sector is encouraged as the availability of finance has a very positive role to play in increasing investment. Although exchange controls have been abolished, there is need for the Central Bank to put in place a regulatory mechanism to prevent or at least limit capital flight.
3. Efforts should be made to develop and improve financial intermediation so that investment is raised as more and more savings are channeled through financial institutions.
4. The exchange rate policy should be one that encourages investment in exporting industries. As exporting industries in Zambia are generally very capital intensive, it highlights the need for increased credit to the private sector.

5. Financial liberalisation policy needs to be perceived as credible and sustainable in order to elicit the necessary beneficial reallocation of resources by the private sector. This credibility cannot be attained overnight as financial liberalisation involves more than the removal of regulation. Without credibility, businessmen will prefer to borrow to finance their losses in the short tem in expectation of a reversal of the financial liberalisation policy. Hence policies should be consistent and credible.

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PPENDIX A

)INTEGRA TION ANALYSIS

Savings
mple: 1965 1996
luded observations: 29
t assumption: No deterministic trend in the data
ies: LSN LRW LDET
s interval: 1 to 2

genvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
16923	37.82604	34.91	41.07	None *
39987	16.72626	19.96	24.60	At most 1
48939	4.676861	9.24	12.97	At most 2

*) denotes rejection of the hypothesis at 5%(1%) significance level

. test indicates 1 cointegrating equation(s) at 5% significance level

normalized Cointegrating Coefficients:

N	LRW	LDET	C
13758	-0.512719	0.281896	1.447880
08395	0.383398	-0.220903	-1.400335
01897	0.412968	0.044052	-1.133589

rmalized Cointegrating Coefficients: 1 Cointegrating Equation(s)

N	LRW	LDET	C
000000	1.239175	-0.681306	-3.499337
	(0.25107)	(0.03158)	(0.52067)

; likelihood -30.40840

rmalized Cointegrating Coefficients: 2 Cointegrating Equation(s)

N	LRW	LDET	C
00000	0.000000	10.08791	316.9883
		(1460.16)	(43256.4)
00000	1.000000	-8.690631	-258.6298
		(1177.52)	(34883.4)

g likelihood -24.38370

Investment

te: 08/12/00 Time: 02:33
mple: 1965 1996
cluded observations: 29
st assumption: No deterministic trend in the data
ries: LIK LDET LRW LDCP LTOT LREX
gs interval: 1 to 2

igenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
.848285	181.4094	102.14	111.01	None **
.798642	126.7227	76.07	84.45	At most 1 **
.702249	80.24529	53.12	60.16	At most 2 **
.558984	45.11181	34.91	41.07	At most 3 **
.424184	21.37029	19.96	24.60	At most 4 *
.168846	5.363263	9.24	12.97	At most 5

*) denotes rejection of the hypothesis at 5%(1 %) significance level
R. test indicates 5 cointegrating equation(s) at 5% significance level

normalized Cointegrating Coefficients:

K	LDET	LRW	LDCP	LTOT
22260	0.991968	-0.146134	-2.952964	-1.727154
24759	-0.634760	1.332701	-0.148026	-0.484934
31274	-0.287256	-0.491898	-0.057478	-0.714570
53927	1.030876	-0.024180	1.629153	0.040458
209743	-0.937237	-0.290151	1.372322	-0.206423
38850	0.185660	0.133827	-0.831138	-0.827077

EX	C
244334	12.14076
12438	-1.070650
117867	4.548347
752749	0.896085
832345	1.343306
514754	4.522373

rmalized Cointegrating Coefficients: 1 Co integrating Equation(s)

K	LDET	LRW	LDCP	LTOT	LREX	C
00000	0.811585	-0.119561	-2.415986	-1.413082	-1.018060	9.33043
	(0.11977)	(0.10459)	(0.16427)	(0.12858)	(0.17184)	(1.04719)

g likelihood 81.54272

rmalized Co integrating Coefficients: 2 Co integrating Equation(s)

K	LDET	LRW	LDCP	LTOT	LREX	C
00000	0.000000	0.725996	-1.193770	-0.931604	-0.049102	3.924238
		(0.11278)	(0.04608)	(0.14551)	(0.06569)	(1.18643)
000000	1.000000'	-1.041858	-1.505962	-0.593256	-1.193909	7.403788
		(0.14505)	(0.05926)	(0.18715)	(0.08449)	(1.52594)

g likelihood 104.7814

rmalized Cointegrating Coefficients: 3 Cointegrating Equation(s)

K	LDET	LRW	LDCP	LTOT	LREX	C
00000	0.000000	0.000000	-1.372638	-1.556220	0.590799	8.969031
			(0.04818)	(0.13005)	(0.16013)	(0.97625)
00000	1.000000	0.000000	-1.249273	0.303114	-2.112213	0.164134
			(0.06553)	(0.17687)	(0.21778)	(1.32772)
00000	0.000000	1.000000	0.246376	0.860357	-0.881411	-6.948791
			(0.06102)	(0.16471)	(0.20281)	(1.23646)

g likelihood 122.3482

ormalized Cointegrating Coefficients: 4 Cointegrating Equation(s)

LIK	LDET	LRW	LDCP	LTOT	LREX	C
.000000	0.000000	0.000000	0.000000	13.41440	26.93788	-169.7596
				(80.7898)	(176.671)	(1062.94)
.000000	1.000000	0.000000	0.000000	13.92825	21.86693	-162.5013
				(73.0111)	(159.660)	(960.596)
.000000	0.000000	1.000000	0.000000	-1.826731	-5.610471	25.13135
				(14.7338)	(32.2198)	(193.850)
.000000	0.000000	0.000000	1.000000	10.90646	19.19449	-130.2081
				(58.7142)	(128.396)	(772.494)

og likelihood 134.2189

rmalized Cointegrating Coefficients: 5 Cointegrating Equation(s)

UK	LDET	LRW	LDCP	LTOT	LREX	C
000000	0.000000	0.000000	0.000000	0.000000	108.0682	-121.8812
					(694.879)	(812.558)
000000	1.000000	0.000000	0.000000	0.000000	106.1050	-112.7889
					(683.413)	(799.150)
000000	0.000000	1.000000	0.000000	0.000000	-16.65855	18.61143
					(112.859)	(131.972)
000000	0.000000	0.000000	1.000000	0.000000	85.15675	-91.28102
					(540.905)	(632.508)
000000	0.000000	0.000000	0.000000	1.000000	-6.048002	-3.569177
					(53.1689)	(62.1731)

g likelihood 142.2224

PPENDIX B

ENERAL MODELS

Savings

pendent Variable is D(LSN)
mple(adjusted): 1973 1996
luded observations: 24 after adjusting endpoints

iable	Coefficient	Std. Error	t-Statistic	Prob.
	0.657516	2.858308	0.230037	0.8246
CG	0.009090	0.019074	0.476591	0.6482
CG(-1)	0.021143	0.011221	1.884172	0.1015
GR	8.83E-07	1.59E-06	0.556503	0.5952
GR(-l)	-6.44E-07	1.89E-06	-0.341281	0.7429
	-0.012637	0.010398	-1.215326	0.2636
(1)	0.007862	0.012824	0.613021	0.5592
RW)	-1.904588	0.564793	-3.372186	0.0119
RW(-1))	0.568677	0.720741	0.789017	0.4560
DET)	-0.015121	0.395952	-0.038188	0.9706
DET(-1))	-0.125221	0.489660	-0.255731	0.8055
DI	0.318923	0.285712	1.116239	0.3012
DI(-l)	-0.321770	0.587817	-0.547399	0.6011
SN(-1))	0.178597	0.402821	0.443365	0.6709
MPS	-0.918304	1.560981	-0.588287	0.5748
MSAUDI	-0.949608	1.686465	-0.563076	0.5910
MSAV(-1)	1.027776	0.456098	-2.253413	0.0589

quared	0.908331	Mean dependent var	0.270431
usted R-squared	0.698801	S.D. dependent var	0.940507
of regression	0.516165	Akaike info criterion	-1.138134
squared resid	1.864985	Schwarz criterion	-0.303679
likelihood	-3.396915	F-statistic	4.335099
bin-Watson stat	2.307426	Prob(F -statistic)	0.028394

Investment

ɔendent Variable is D(LIK)
ıple(adjusted): 1973 1996
uded observations: 24 after adjusting endpoints

iable	Coefficient	Std. Error	t-Statistic	Prob.
	-0.398518	1. 040009	-0.383187	0.7271
	0.001393	0.008466	0.164509	0.8798
(-1)	-0.017601	0.007318	-2.405289	0.0954
	0.034321	0.022285	1. 540093	0.2212
(-l)	-0.016171	0.039604	-0.408325	0.7104
RW)	-0.020672	0.535177	-0.038627	0.9716
RW(-1))	-0.045738	0.451800	-0.101236	0.9258
REX)	1.207546	0.848549	1.423072	0.2499
REX(-1))	1.949953	1. 052950	1.851896	0.1611
DCP)	0.246574	0.524425	0.470179	0.6703
DCP(-1))	0.571697	1.538298	0.371643	0.7349
TOT)	-0.695447	1.382685	-0.502969	0.6496
TOT(-l))	0.214387	0.652046	0.328791	0.7639
DET)	-0.425169	0.737727	-0.576323	0.6048
DET(-l))	-0.586170	0.649101	-0.903049	0.4331
DI	0.150721	0.178654	0.843650	0.4608
DI(-l)	-0.026135	0.224480	-0.116425	0.9147
IK(-l))	-1.043391	0.525281	-1.986350	0.1412
MPS	0.523417	0.838194	0.624458	0.5766
MSAUDI	0.421597	0.731827	0.576089	0.6049
MIK(-1)	0.505649	0.387342	1.305432	0.2828

squared	0.957708	Mean dependent var	0.298478
djusted R-squared	0.675760	S.D. dependent var	0.452042
E. of regression	0.257402	Akaike info criterion	-3.043671
m squared resid	0.198768	Schwarz criterion	-2.012874
g likelihood	23.46953	F-statistic	3.396755
rbin-Watson stat	2.898991	Prob(F-statistic)	0.171036

PPENDIX C

RSIMONIOUS MODELS

Savings

pendent Variable is D(LSN)
mple(adjusted): 1974 1996
luded observations: 23 after adjusting endpoints

iable	Coefficient	Std. Error	t-Statistic	Prob.
	0.423333	0.111358	3.801559	0.0013
CG(-1)	0.018373	0.007140	2.573103	0.0192
LRW)	-1.352302	0.443305	-3.050498	0.0069
LFDI(-1))	-0.442572	0.154140	-2.871236	0.0102
MSA V(-1)	-0.557416	0.166429	-3.349263	0.0036

quared	0.752659	Mean dependent var	0.320253
usted R-squared	0.697695	S.D. dependent var	0.928698
. of regression	0.510619	Akaike info criterion	-1.154601
n squared resid	4.693180	Schwarz criterion	-0.907755
g likelihood	-14.35767	F-statistic	13.69354
rbin-Watson stat	1.492601	Prob(F-statistic)	0.000027

Investment

ɔendent Variable is D(LIK)
ıple(adjusted): 1967 1996
uded observations: 30 after adjusting endpoints

iable	Coefficient	Std. Error	t-Statistic	Prob.
	-0.009777	0.064575	-0.151401	0.8809
	0.021674	0.012859	1.685485	0.1049
-1)	-0.007893	0.001493	-5.286963	0.0000
REX)	0.445224	0.209654	2.123611	0.0442
REX(-1))	0.316498	0.199703	1.584838	0.1261
MIK(-1)	-0.154792	0.089001	-1.739212	0.0948

quared :	0.662491	Mean dependent var	0.260921
usted R-squared	0.592176	S.D. dependent var	0.423676
of regression	0.270564	Akaike info criterion	-2.43763
squared resid	1.756918	Schwarz criterion	-2.15739
likelihood	-0.003610	F-statistic	9.421829
ɔin-Watson stat	2.443578	Prob(F-statistic)	0.000045

Fig.5.1 Plot of Recursive Residuals – Savings Model

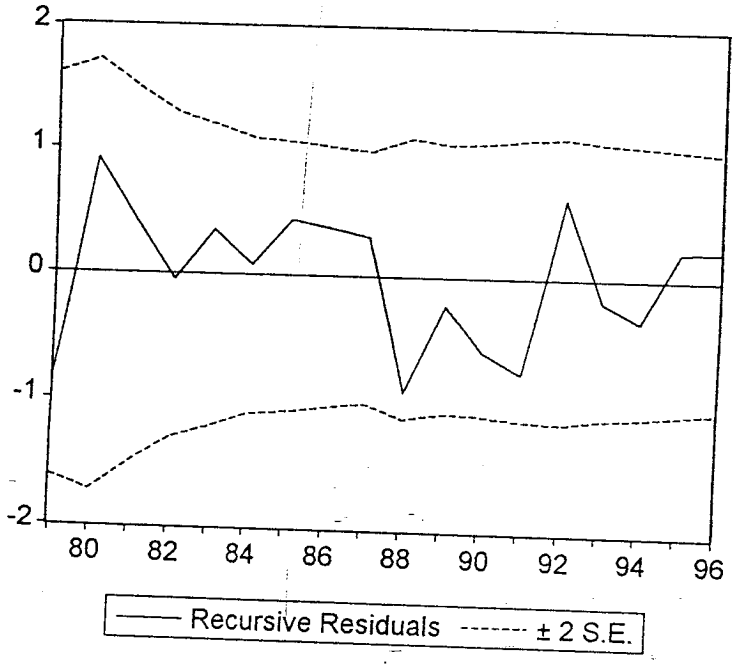

Fig. 5.2 Recursive Plots Coefficients - C(1)=constant; C(2)=lagged income growth rate; C(3)= first difference in world interest rate; C(4)=lag of first difference in foreign direct investment; C(5)=lag of error correction term

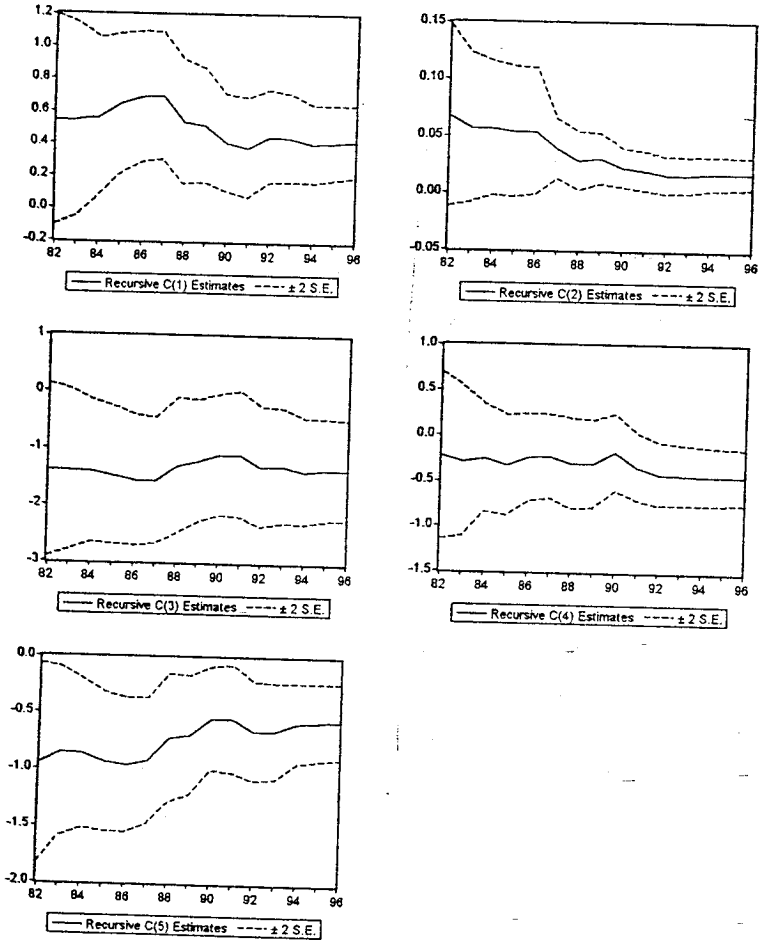

Fig. 5.3 Plot of Recursive Residuals – Investment Model

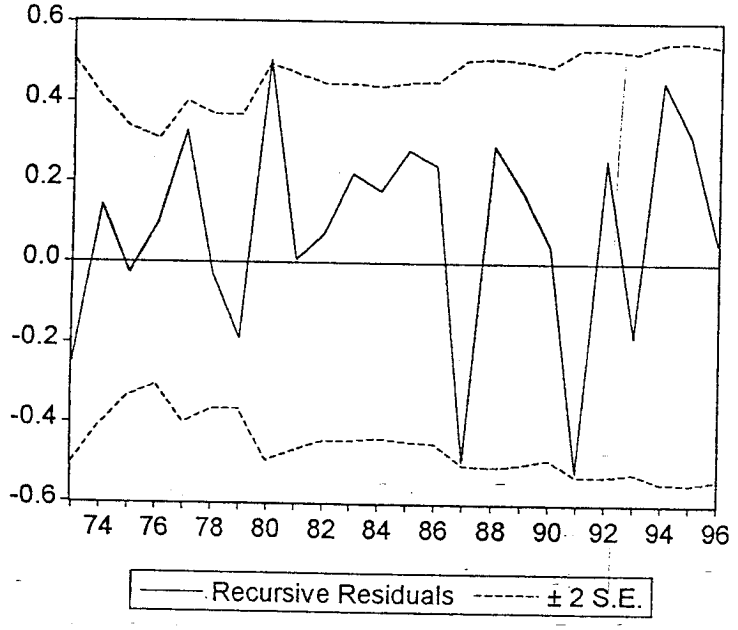

Fig. 5.4 Recursive Plots Coefficients - C(1)=constant; C(2)=output growth rate; C(3)= lag of domestic real rate of interest; C(4)= first difference of real exchange rate; C(5)= lag of first difference of real exchange rate; C(6)=lag of error correction term

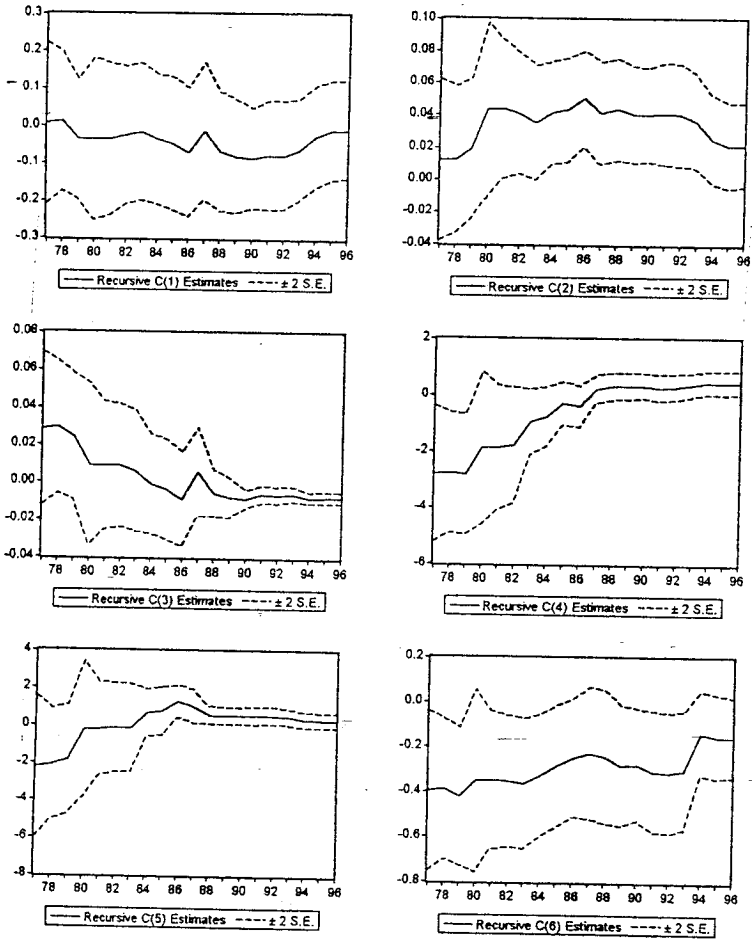

Fig. 5.5 Plot of CUSUM Recursive Residuals – Savings Model

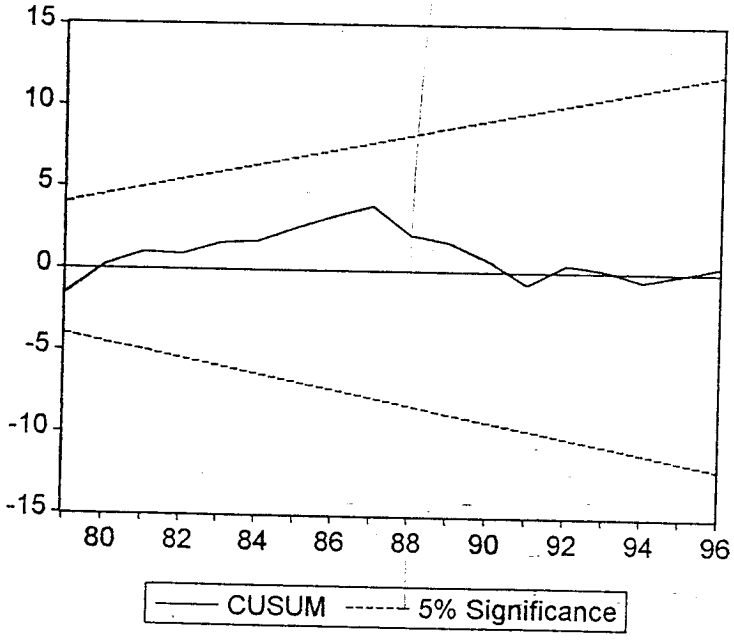

Fig. 5.6 Plot of CUSUM Squared Recursive Residuals – Savings Model

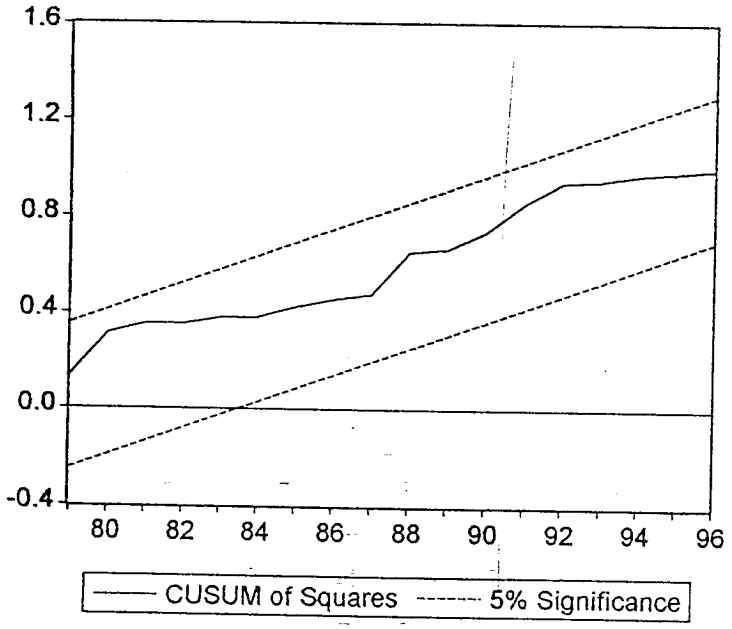

Fig. 5.7 Plot of CUSUM Recursive Residuals – Investment Model

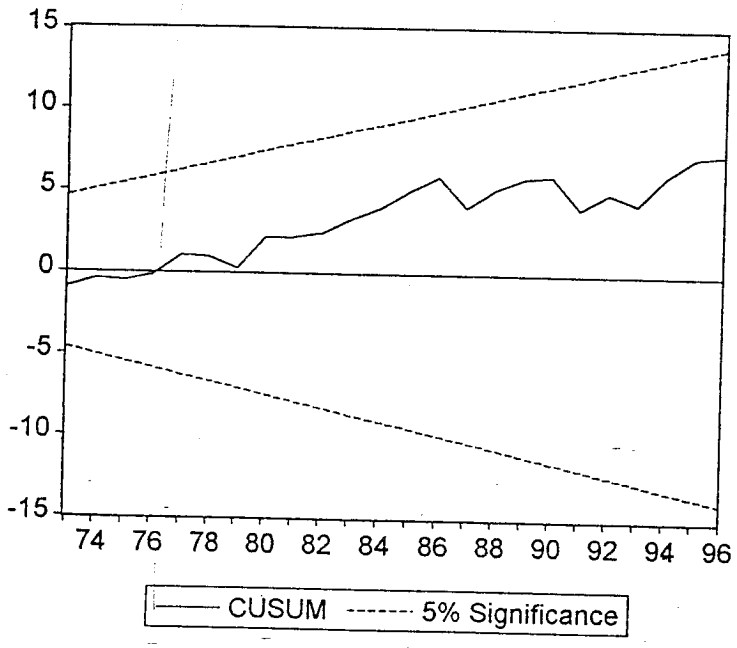

Fig. 5.8 Plot of CUSUM Squared Recursive Residuals – Investment Model