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MACROECONOMIC DETERMINANTS OF PRIVATE INVESTMENT IN NAMIBIA

BY

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DEDICATION

This work is dedicated to my mother Asnath Harupara Tjombonde, my daughter, Mbenaa Metirua Harupara and my nephews Kefas Ngutjinazo, Eberhardt Kaitjindi and Edwardt Ngutjinazo.

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ABSTRACT

An econometric analysis of the determinants of private investment with the aid of the Engle and Granger (1987) Two-step procedure suggest that in the long-run private investment is affected positively by public investment, real gross domestic product (real output), credit to the private sector, depreciation of the exchange rate and negatively by an increase in the inflation and real interest rate.

In the short-run an increase in public investment and real gross domestic product (real output) stimulates private investment in Namibia. However, increases in inflation and real interest rates as well as depreciation of the exchange rate were found to inhibit private investment in the short run.

The central policy recommendation of this study is that the maintenance of a stable macroeconomic environment is crucial to efforts aimed at encouraging private investment and thus toward laying the foundation for sustained economic growth in Namibia. These will be derived from a low and stable inflation rate, stable and predictable exchange rate, reduction in unemployment levels brought about by increased private sector participation in the productive sector of the economy, and by limiting the role of the public sector to the provision of essential services that do not compete with the private sector for scarce credit.

TABLE OF CONTENT PAGE

Page

LIST OF TABLES

(i) **Tables in the text**

(ii) **Tables in the appendix**

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

Investment, may be defined as expenditure on real capital goods. Thus, it is the amount by which the stock of capital of a firm or economy increases, once we have allowed for replacement of capital which is scrapped. Private investment has been almost studied in details in industrial countries. However, studies on private investment in developing countries are few and there does not seem to be any convergence of views about the factors which affect private investment behaviour. This contention makes it an interesting area of research as it will help identify a country specific determinants of private investment activity.

Sub-Saharan Africa recorded the lowest private investment rates in the 1980s as well as early 1990s compared to Latin America and East Asian countries both being classified as developing countries. In 1995 Sub- Saharan Africa on average experienced the first significant increase in private investment and Gdp growth since the beginning of 1990. At less than 10 % of Gdp, one third the level achieved by East Asian countries, the levels of private investment in Sub-Saharan Africa are still among the lowest.[1]

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[1]. Bouton L, Sumlinski, M.A., 1995, IFC, Discussion Paper No. 31.

In the last two decades an unsatisfactory performance in Southern African Development Community (SADC)--to which Namibia is member has been the decline in investment and saving rates.

At the end of the 1970s, the unweighted shares of gross domestic investment and saving in GDP were 28.2% and 23.3% respectively (see Mlambo and Elhiraika, 1997). In the 1980s , these declined to 22.9% and 19.1%, respectively. The investment rates recovered slightly to 26% of GDP between 1990 to 1993, while gross domestic saving rates continued to decline, falling further to 16% of GDP. Average real GDP growth for SADC countries declined from 5.5% between 1973 to 1979, to 4.2% during the 1980s, and 2.8% during the 1990s.

Although external shocks such as the debt crisis, worsening terms of trade, played an important role in reducing investment and saving and eventually real growth, domestic policy mismanagement seems to have played an overriding role (Mlambo and Elhiraika, 1997).

On a positive note, the 1990s saw a resilience in private investment in many developing countries attributable largely to improvements in domestic policies due to the adoption of structural adjustment programmes (both IMF-sponsored and self imposed) which led to a rise in economic growth rates in some countries.

We may, therefore deduce that faster growth may lead to a higher future share of private investment in GDP.

1.2 Statement of the Problem

Over the last decade, a strong consensus has emerged that the achievement of more dynamic economic growth requires a greater role for the private sector, which is whole-heartedly supported by the Namibian government. In this sense, private domestic investment in developing countries needs to be seen not only as a contributor to economic growth and employment, but also as a catalyst to attract foreign direct capital.

In Namibia, the 1970s and early eighties were characterized by low private investment activity which led to the slow advancement in the economy. The average GDP growth rate for 1980 to 1989 was 2.8%[2] compared to the impressive levels of about 8.7% achieved in the 1960s. Independence from apartheid in 1990 has been accompanied by a recovery in growth averaging 4.0% between 1990 and 1996 in the face of a slow increase in the ratio of private investment to GDP. This occurred despite the significant decline in the ratio of public investment to GDP from 11.3% during 1980 to 1989 to 8.1% in the period 1990 to 1996.

An interesting feature can be observed in the trends of public and private investment as ratios of GDP (see, Figure 1 overleaf).

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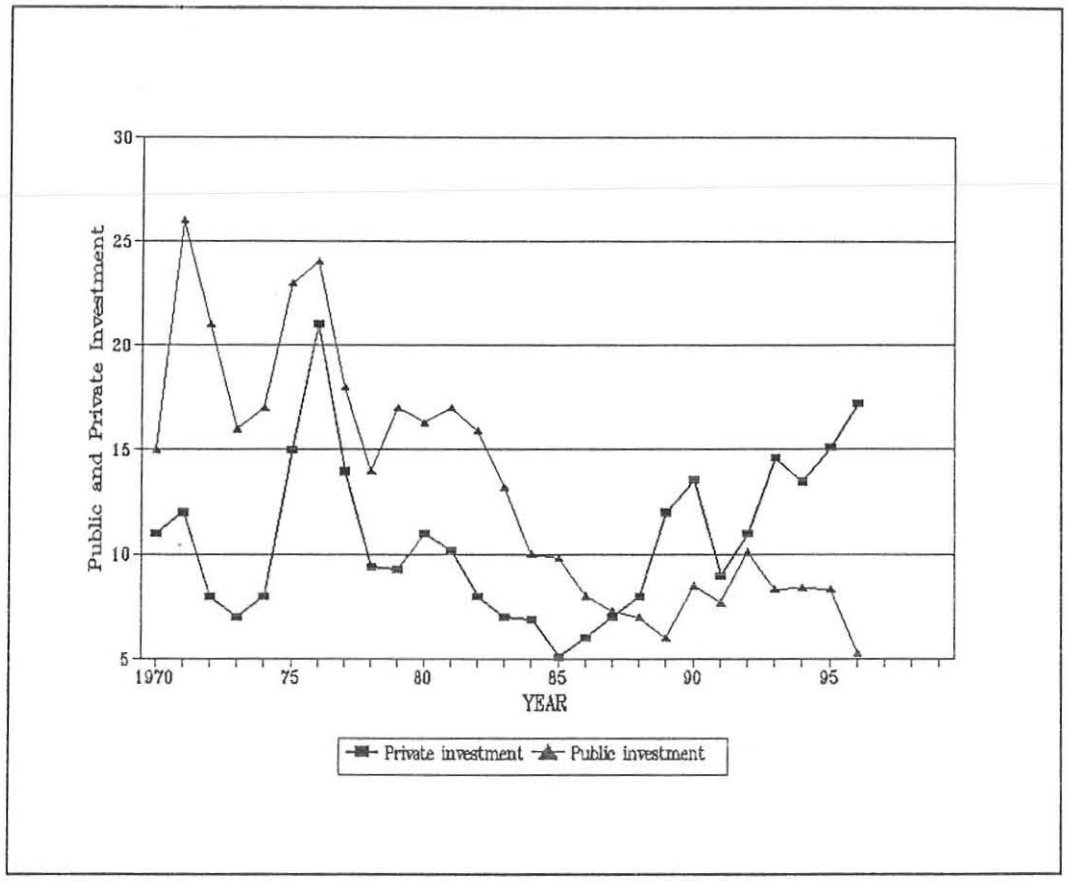
[2]. African Development Indicators, 1996.

Figure 1. Public and Private investment as ratio of GDP in percentage.



It is apparent that public and private investment rates have been exhibiting similar movements during the 1970s and early 1980s. That is they exhibited a similar pattern in growth and decline with the public sector playing a dominant role in aggregate capital formation. However, emphasis have started shifting away from the public sector from 1986 to 1996 as can be observed from the evolution of private investment rates.

Bearing in mind that Namibia gained her independence in 1990, it is clear that a number of factors both external and internal were at play during the liberation struggle which might have inhibited private capital accumulation.

Therefore, the aim of this thesis is to identify the factors that were responsible for the slow growth in private investment during the period under review.

1.3 Objectives of the Study

The main objectives of undertaking this research are to:

1. Identify the main Macroeconomic determinants of private investment in Namibia.
2. Analyze private investment behaviour in Namibia, and its response to domestic policies and macroeconomic uncertainties.
3. Finally, suggest some policy measures to improve the investment climate in Namibia.

1.4 Statement of the Hypotheses

The validity of the following hypotheses will be tested empirically.

1. Public investment crowds in private investment activity in Namibia.
2. Credit to the private sector enhances private investment accumulation.
3. Private investment is positively related to growth of real output.
4. Macroeconomic instability as proxied by the variability of the inflation rate is detrimental to private investment.
5. Depreciation of the exchange rate stimulates private investment in Namibia.

1.5 Significance of the Study

This study involves an econometric analysis of the major determinants of private investment in Namibia. It employs the Engle and Granger two-step procedure to identify the short and long- run determinants of private investment in Namibia. To my knowledge, there is no comprehensive timeseries econometric study conducted on the determinants of private investment in Namibia. Therefore, this study will be an added advantage to the existing literature on private investment in developing countries in general, and Namibia in particular. It may also modestly aid policy makers in Namibia in decision making on private investment related issues.

1.6 Organization of the Study

The thesis is divided into six chapters. The first chapter apart from serving as the introduction to the study, it also states the objectives and hypothesis of the study.

Chapter 2 provides an overview of the Namibian economy with special emphasis on the economic conditions that prevailed before and after independence. It culminates in an analysis of the trends in private investment.

Chapter 3 reviews the theories of investment and also provides an exposition on the macroeconomic determinants of private

investment with special reference to the empirical findings on the determinants of private investment in developing countries.

In chapter 4, we outline the private investment model which includes an error-correction mechanism which reflects the convergence of investment on its long-run equilibrium. Chapter 5, analyzes the empirical results from the private investment model and Chapter 6 concludes the study with policy implications and recommendations as implied by the empirical findings.

1.7 Scope and Limitations of the Study

We attempted to analyze the macroeconomic determinants of private investment over a 27 year period, starting from 1970 to 1996. Data for this study was extracted mainly from national sources, but sources like African Development Indicators (various issues), Trends in Private investment in Developing countries and IMF statistics (various issues) were also consulted to obtain consistent data.

It is a well documented fact that timeseries data on most macroeconomic variables is scarce and research therefore is done subject to certain limitations.

To start with, data on the consumer price index for Namibia is just collected from the capital, Windhoek and one may thus tend to cast doubt on its applicability as an indicator of the

inflation rate (captured by the change in the consumer price index) for the country as a whole.

Due to data limitations, we could not disagggregate public investment into infrastructural and non-infrastuctural components and consequently an examination of the relationship between the two components could not be undertaken. We could also not obtain sufficient data on real per capita income, therefore this variable was not considered in the estimations.

Given these limitations, the results from this study should be regarded as suggestive rather than conclusive. Future research on this issue should focus on other potential determinants of private investment behaviour such as corporate taxation, foreign direct assistance, import restrictions and real per capita income among others. Although not comprehensive in its coverage, this research will aid policy makers and serve as basic reference to similar studies on Namibia as this issue hitherto has not received much attention from researchers.

CHAPTER 2

OVERVIEW OF THE NAMIBIAN ECONOMY

Namibia is one of the low middle income countries in Sub-saharan Africa (SSA) and had a population of 1.58 million and per capita income of US $2,080 in 1996. It is also together with South Africa and Swaziland the only countries which are not under IMF supported structural adjustment programs in SADC region. This means that the economy of Namibia is open to the extent that market forces are given prominence in the determination of prices and wages. Namibia since 1939 until 1989 was incorporated as the fifth South African province. South Africa has played and is still playing a major role in the Namibian economy due to the latter reliance on its imports (about 90%) and huge investment by South African companies. The umbilical cord with South Africa is further strengthened by Namibia's membership to Southern African Customs Union (SACU), Southern African Development Community (SADC) and Common Monetary Area (CMA) [3].

Its SACU membership limits Namibia's ability to modify international trade policies like tariffs, which are dictated by South Africa as the dominant partner. Namibia depends on its SACU allocation for about 34% of government tax revenue. However, this increased dependence on SACU allocation is increasing Namibia's

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[3]. See, Tjirongo (1995) for a comprehensive discussion on SACU, SADC and CMA. SACU member countries are, South Africa, Namibia, Botswana, Swaziland, and Lesotho. SADC consist of all SACU members as well as Angola, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe.

fiscal vulnerability- especially if we consider the eagerness of South African policy makers to reduce tariffs (Rossow, 1997).

Equally, its reliance on primary sectors makes it dependent on climatic conditions, particularly the level of oxygen in sea water (fishing) and weather conditions (agriculture). Any change in these conditions may have a considerable impact on the country's economy. This vulnerability is clearly demonstrated by the adverse impact the severe drought and exceptionally low oxygen levels in Namibian fishing waters have already had on the livestock and fishing industries over the past few years.

Another trademark of the Namibian economy is the exceptionally high stake of the general government sector (for 1996/97 about 26.6% of GDP at basic prices and the highest sectoral contributor) in the country's economy. Excessive dependence on the government's GDP contribution makes the Namibian economy very vulnerable in terms of growth prospects. Ultimately, for this contribution to be sustainable, government can only spend what it receives in tax earnings from the private sector as excessive borrowing are risky and counter-productive. However, such a situation cannot be sustained over the long run as it will tend to expand the government budget deficit to destructive levels in the face of increased dissaving.

This chapter is divided into three sections. The first section provides an overview of the macroeconomic performance of the Namibian economy before and after independence.

The second section presents the World Bank strategies for private sector development. In the third section we analyze the trends in private investment in Namibia.

2.1 The pre-independence Period (1980-1989)

To give a proper assessment of current economic developments in Namibia it is essential to briefly revisit the economic circumstances that prevailed prior to independence since these have been undoubtedly instrumental in shaping the government's economic policies after independence as evident in Table 1 below.

TABLE 1: Some key macroeconomic indicators Period averages (%)

	1980-1989	1990-1996
Real GDP growth	2.8	4.3
Private investment/GDP	8.2	13.4
Public inves tment/GDP	11.3	8.1
Private saving/GDP	3.3	3.8
Public saving/GDP	15.1	13.5
Fiscal balance	-9.5	-6.6
Growth of private sector credit	18	25
Growth of public sector credit	27	20
Lending rate	16.7	19.6
Inflation rate	13.1	12.0
Nominal exchange rate	2.3	3.3
Terms of trade	1.3	-3.5
Growth rate in total exports	3.4	6.0
Growth rate in total imports	4.5	2.4
Current account of BOP/GDP	7.0	4.0

Source: African Development Indicators (1997) and Namibian Economic Review (various issues).

Namibia, on the eve of independence could be described as having had a siege economy, which was isolated from the rest of the world and characterised by extreme disparities in access to and distribution of income and public facilities. The former authorities exploited the country's natural resources for income generation, foreign trade and public revenue.

This was done at the expense of industrial development, food sufficiency and the development of a money and capital market. Moreover, heavy military spending injected purchasing power into the Northern areas to finance military operations during the liberation struggle. In addition a large and cumbersome government structure aggravated the inflationary potential which was about 20.4 percent during the 1970s.

Public expenditure was heavily subsidized by the South African government or was financed through loans raised mainly on the South African capital market, thus sustaining a highly artificial level of spending.

During the pre-independence period, the Namibian economy depended heavily on the mining and agricultural sectors as the main source of foreign exchange earnings. These two sectors were susceptible to certain peculiar extraneous forces such as the natural elements, i.e the climate and agricultural diseases as well as the international business cycle, affecting prices, stocks and demand.

A case in point is the decline in diamond production from 196,802 carats in 1937 to 30,0174 carats in 1940 attributed to unfavourable business cycles in international markets. This led to a fall of mining product contribution from 27% in 1938 to 4% in 1940 (see, Namibian Economic Review, 1986).

The agricultural sector was also hit hard by the outbreak of foot-and-mouth disease during the early sixties. In 1959, marketing of live cattle to South African markets reached a high level of about 310,000 heads, but unfortunately this quota was halved during the early sixties. Its contribution to GDP, therefore, reached an all time low of 3% in 1960 compared to its highest share in GDP of 57% in 1943.

In aggregate, this trend of events resulted in total exports to decline to a growth rate of 3.4% between 1980 and 1989 compared to the 5% achieved in the late sixties and early 1970s. These figures also give an indication of the availability of Namibian foreign exchange reserves before independence as manifested in the decline in the growth rate of terms of trade from 2.5% in the 1970s to 1.3% during the eighties.

Towards independence, the economic activity was clearly beginning to level off, resulting mainly from the poor performance of the primary sectors and the very low investment level in both the private and public sectors with gross domestic investment falling from 34.2% during the seventies to a disappointingly low level of about 19.2% during the period 1980 to 1989. This was due to

resources being diverted towards public consumption as it rose from 13.1 to 27% during the 1970s and 1980s, respectively.

In the same vein, private consumption also accelerated from 45.1% between 1970 and 1979 to 59% during the 1980s. Thus, the economy of Namibia appear to have been much more consumption based during the period under review.

Government revenue during the 1970s constituted about 13% of Gdp and rose to 25.5% in the 1980s which is a clear indication of efficiency in tax collection and administration in Namibia. Overall, the Namibian economy was developing at a slow rate as reflected in the GDP growth rate of 1.8% in the 1970s which only increased by a small margin to about 2.8% between 1980 and 1989. In brief the Namibian economy was characterized by structural imbalances which led the economy to advance slowly.

2.2 Post-independence period (1990-1996)

This section reviews the recent macroeconomic performance of the Namibian economy with reference to the structural changes that occurred in the conduct of monetary and fiscal policies as contained in Table 2 overleaf.

TABLE 2: Some recent indicators of the macroeconomic performance of the economy of Namibia.

(% Changes if not otherwise indicated)

VARIABLES	1990	1991	1992	1993	1994	1995	1996
Domestic credit	35	11	90	29	28	31	23
Credit to private sector	20	17	30	30	31	34	19
Credit to public sector	65	60	-245	30	4	17	56
Growth of money supply	40	34	22	46	15	8	54
Inflation rate	12	11.9	17.7	8.5	10.74	10.06	9
Lending rate	21	23.4	20.2	18	17.05	18.51	19.16
Fiscal balance	-2.4	-5.4	-6.3	-9.6	-7	-5.1	-4.3
Govt revenue/GDP	34.1	28.9	32.2	33.9	29	31.5	35.7
GDP growth rate	0.4	7.4	7.9	-1.4	6.7	4	5
Gross domestic saving/GDP	15.3	9.1	12	9.8	19.3	14	14.7

SOURCE: African Development Indicators (1997)

2.2.1 Monetary policy

The concept that no financial system exists in isolation is especially true in the case of Namibia. The extreme openness of its monetary system to that of South Africa leaves it with very little leeway to manoeuvre its own monetary policies. Monetary policy in South Africa as in other monetarily independent countries is a product of both local and international trends. However, in Namibia monetary policy is almost exclusively a product of trends in South Africa and the rest of the world, leaving it in an awkward position where its unique internal

circumstances play little part in the monetary policy which inevitably has to be applied locally.

Under the financial rand system of the CMA- a single exchange rate control territory comprising Lesotho, Namibia, South Africa and Swaziland has been established. The Namibian dollar, introduced in 1993, is pegged to the South African rand which is also legal tender at par. The exchange rate of the Namibian dollar against other currencies are determined on the basis of cross rates of the South African Rand against the currencies concerned in international markets.

A brief history of the South African exchange rate regime as it also applies to the economy of Namibia is in order, which has undergone numerous changes in the past three decades (see, Aron and Ayogu, 1997).

After being pegged or fixed for most of the 1970s the principal (rate or commercial rand) was designated floating from the second quarter of 1979, when an official dual regime with a fully market-determined rate for capital transactions was instigated. The secondary rate, or financial rand, replaced an earlier floating capital transaction rate applying only to non- residents purchases of shares, which were not transferable across non-residents. The commercial and financial rates were temporarily unified during 1983 to 1985, but a dual system was reinstutited and persisted until the second unification in early 1995. Currently, the exchange rate regime operating in South Africa,

implicitly Namibia is a floating exchange and the nominal exchange rate has been overvalued historically.

In the 1970s the US $ and the Rand exchanged 1 to 1. It depreciated slightly to 2.3% during the eighties and to 3.3% from 1990 to 1996. This poses a problem for Namibian exports as they are likely to be more expensive compared to those of competing countries. The rand is also legal tender in Lesotho but not in Swaziland.

South Africa, as the dominant partner dictates foreign exchange control measures and monetary policy in practice. The biggest advantage for the smaller partners is using South African foreign reserves for their own monetary stability.

Namibia inherited a fairly well developed physical infrastructure, banking and financial institutions, most of which are privately owned, especially in major towns. To complement the financial development effort, the Namibian stock exchange market was also established in 1993.

On the contrary, credit is not easily accessible to communal farmers that are responsible for 60% of beef exports and this tends to inhibit progress in this sector. The main reason being the collateral requirements by banking institutions which can hardly be met by an ordinary communal farmer. As a result, investors in the small scale industries and communal farmers have to face high interest rate on their loans, which exerts

tremendous pressure on the profitability of their businesses. This situation is also exarcebated by the nature of their businesses, which are highly sensitive to the business cycle.

Private investors in urban areas and commercial farmers are more fortunate as they can get credit on good terms, because they are having the securities required by banks such as insurance policies and fixed assets.

The Central Bank of Namibia(CBN) highlighted the major monetary developments in 1996 as being the result of strong growth in money supply and credit extension to the private sector, the increase in the bank rate and subsequent increases in commercial banks prime lending rates[4]. Domestic credit extension by the banking system increased substantially, starting from a low of 11 percent of GDP in 1991 to 90 percent in 1992 **(see, Table 2)**. This was an attempt aimed at reviving the private investment activity in Namibia from its poor performance in the 1980s.

The following year, the Central Bank of Namibia tightened its monetary policy as it resulted in a decline in domestic credit to about 28 percent in 1993 and 1994, but it was increased again to 31 percent in 1995.In 1996, the CBN embarked upon a restrictive monetary policy, which decelerated domestic credit extended to about 23 percent in order to contain the inflationary pressures that prevailed at that time.

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[4]. Namibia Business journal, February 1996, Volume 6 Issue 1.

Credit granted to the private sector in 1991 was about 17 percent and rose sharply to 30 percent between 1992 and 1993. In subsequent years, credit to the private sector rose to an average of about 34 percent. This shows government intentions towards economic growth spearheaded by the private sector.

On the other hand, credit granted to the public sector was 60 percent in 1991, mainly to finance the implementation of the National Development programme as well as to fund public corporations inherited from the South African regime. Thereafter, the government embarked upon commercialization program which saw public corporations such as Telecom, Namibia Broad Casting Corporation (NBC) and Namibia Electric Corporation (NEC) becoming parastatals. This is evident in the reduction of credit to the public sector to about 4 percent in 1994. Overall, credit extended to the private sector from 1990 to 1996 was about 25 percent compared to 20 percent granted to the public sector.

Money supply, which is comprised of currency in circulation and demand in savings deposits popularly referred to as "M2" in the literature registered a 34% annual average growth rate in 1993 and 46% in 1994. We should note that this average growth rate is by comparison higher than the average annual rate of inflation which is about 10%. This is a cause for concern, largely due to the fact that the rate of increase in money supply far exceeds the rate of inflation and that of GDP. This trend, therefore places a strong pressure on prices and create inflation and inflationary expectations.

Namibia, historically had low inflation rates. Though it has been volatile during some periods, it never exceeded 25 percent per annum. The average rate of inflation for the period 1980 to 1989 was about 13.1 percent compared to 1990s during which an average rate of inflation of 12 percent was recorded.

In 1990 and 1991, the rate of inflation was stable at 11.5 percent, but started to rise again, reaching the highest level of 17 percent in 1992 due to the increase in the budget deficit associated with excess demand for goods as well as the sharp rise in consumer bank credit. However, in 1993 the rate of inflation declined to an impressive 7 percent per annum due to firstly, lower production price increases in South Africa; secondly, the relatively strict anti-inflationary monetary policy introduced by the South African monetary authorities and also pursued by the Bank of Namibia; and finally, the low level of economic activity in Namibia and South Africa (Namibian Economic review, 1994). Thereafter it rose to 10.74 percent in 1994 and declined to 10.06 and 9 percent in the period 1995 to 1996 respectively.

Related to the rate of inflation is the lending rate determined by market forces which recorded 21 percent in 1991 and declined to 20.2 percent in 1992. This downward trend continued in 1993 and 1994 registering 18 and 17.05 percent per annum in both years. In 1995 and 1996 the lending rate increased to 18.51 and 19.16, respectively. This increase could be ascribed to the high demand for credit by both the public and private sectors. The lending rate is susceptible to spillover effects from South

Africa because of the inter-dependence of the banking systems in Namibia and South Africa.

The function of the CMA is not only limited to providing free entry to South African foreign reserves for Namibia. Because, the free flow of capital also implies that funds can flow from Namibia to South Africa undisturbed, if interest rates are favourable in South Africa. This agreement, therefore is making provision for arbitrage to take place between both countries. To retain this critical balance, Namibia have no alternative but to increase its deposit and lending rates in line with adjustments in South African rates.

2.1.2.1 Fiscal policy

The Namibian economy is dominated by the service sector to which government services contribute 47%. This is due to the fact that at independence the new government had to consolidate 11 ethnic - based " second tier" authorities, an equal number of municipalities, and several statutory entities, as well as one administration for whites and one central authority.

Regarding the fiscal balance, Namibia's nominal current account deficit as ratio to GDP averaged 10.1 percent between 1975 and 1984, but improved slightly to an average of 9.5 percent during 1985 to 1989 (African Development Indicators, 1997). In 1990, the current account deficit improved significantly to 2.4 percent, but this trend could not be maintained as the deficit

rose from 5.4 percent in 1991 to a high level of about 9.6 percent in 1993. Thereafter, the government tightened fiscal policies as manifested in low budget deficits of 7 percent in 1994 to 4.3 percent in 1996. Overall, for the period 1990 to 1996 the current account deficit improved to a remarkable 6.6 percent compared to the higher rates of the 1980s **(see, Table 1, page 11)**. This trend shows good fiscal discipline on the part of the Namibian government as it resulted in lowering expenditures and raising revenue.

Government revenue has been increasing steadily since 1990, registering an annual average growth rate of 32.2 percent between 1990 and 1996 which is a significant improvement on the average growth rate recorded in the eighties of about 25.5 percent. To ensure efficiency in tax administration, the Ministry of Finance has launched a tax administration project which will be investigating the feasibility of a value added tax system for possible introduction between the period 1998 and 2000 (Rossow, 1997).

According to Tjirongo (1995) the major external shocks that the Namibian economy was subjected to between 1980 and 1992 were due to changes in the demand for minerals and in mineral prices, adverse weather conditions and the political unrest in South Africa. The international demand for diamonds plummeted during 1981 to 1983 in the aftermath of 1979 to 1980 oil price induced recession in industrial countries. Thus, the speculative demand that prompted unprecedented increases in diamond prices in the

late 1970s collapsed in 1981. This is reflected in the annual average changes in terms of trade which was about 1.3 percent between 1980 and 1989 compared to the negative growth rate of 3.5 percent during the 1990s **(see, Table 1)**. These factors might have contributed to the slow economic growth in Namibia during the 1980s and early 1990s judging from a fall in real GDP growth rate from 1.8 percent during the 1970s compared to the impressive level of 8.7 percent achieved in the sixties. However, this downward trend was reversed in the eighties as the Gdp growth rate increased to 2.8 percent. Prospects for growth started showing in 1991 and 1992, but the year 1995 saw a disappointing reversal of fortune from the vibrant 6.7 percent growth achieved in 1994 to 5 percent in 1996. This is attributable to the decline in a drought-plagued agricultural output from a 19 percent growth in 1994 to just 9 percent in 1995. On average GDP growth rate improved much better registering an annual average of about 4 percent between 1990 and 1996.

Real GDP per capita recorded a decrease of 0.5 percent in 1995 compared with a growth of 3 percent in 1994, due to the modest growth experienced in the GDP.

With regard to the external debt position, the pre-independence debt was assumed by the South African government. Namibia's, post-independence foreign loans which have been negotiated, are due to the grace period and not yet being serviced. Thus the impact of external debt will be felt in the future. The Minister of Finance in the 1997/98 budget speech expressed his concern

about the rate at which the post-independence debt has accumulated from 2% of GDP at independence to 16% in 1996. Since independence, the Namibian government borrowed almost exclusively from the local financial market, although some foreign borrowing was secured during the last few years. The instruments government uses to tap the local market are primarily short-term treasury bills and short to medium- term government stock. The foreign borrowing window was opened only after a suitable arrangement had been secured with the Bank of Namibia, in terms of which governments foreign exchange risk was neutralized by reinvesting foreign borrowed currencies in overseas market.

The above cited statistics shows that the Namibian economy still face some structural rigidities which needs immediate corrective measures.

2.3 Private Sector Development Agenda : Strategies by the World Bank

In recent years, a broad consensus has emerged among economists that by unleashing competitive forces and enhancing international competitiveness, a healthy private sector can provide both growth and jobs. They advocate for shifting the role of the public sector towards provision of essential services such as education and health , thereby reducing its intervention in the productive sector of the economy to the extent that maximum private sector development can be realized.

The World Development Indicator (1997) outlines the following strategies in order to enhance private sector development during the 1990s. These strategies are discussed briefly below:

(a) Developing countries must establish a more inviting business environment. Sound macroeconomic management has to substitute inconsistent policies that undermine the confidence of the private sector. But governments also have to play an active role in promoting competition and reducing risk, and in the process cut the high costs of doing business.

This involves enforcing an array of policy, legal, regulatory and institutional reforms with full participation by the business sector and the labour force.

(b) They need to accelerate financial reform. To achieve this objective governments have to restructure and where appropriate privatize banks, strengthen regulation and supervision and develop the basic financial infrastructure to service a broad segment of the population, especially small businesses.

(c) Developing countries need to go faster and further with public enterprise reforms. In many developing countries the public sector is the largest employer to the extent that it dominates in the overall economic activities, thereby competing with the private sector in the productive side of the economy. Governments, therefore have to privatize utilities and large enterprises. When appropriate it can also liquidate major loss- makers. These public enterprises

employ only a small fraction of the labour force but absorb a large part of government expenditures and credit from the banking system. Failure to address these losses threaten reform programs and diverts resources from pressing social needs.

Having outlined the strategies, a question that will strike one's mind is:

How do we track progress in developing the private sector?
This can be done by following three sets of indicators (World Bank 1991a).

First, a changing **public-private balance** is shown in an expanding private sector and a diminishing government role in the economy. Private sector growth is reflected in higher private sector credit and investment, inflows of private capital and in expanding capital markets. As the private sector grows, the government diverts resources into building human resources and thereby reducing its intervention in the economy.

This shift is reflected in the amount of central government expenditure, in the amounts of public investment, publicly guaranteed debt and domestic borrowing, and in the shares of government and state-owned enterprises as well as in the competition created in economic activity.

Second, to capture the potential of the economic environment to promote private sector development, **incentives** for investment

have to be in place. These incentives are measured by integration with the global economy, trade competitiveness, trade policies and key prices in the economy, tax policies and the legal and regulatory framework.

Thirdly, since **support systems** are crucial for enhancing private sector development , there is a need to assess and improve the financial sector depth and efficiency, the level of employees skills and the development of infrastructure and scientific and technological capacity. Although the strategies to be implemented and the control procedures are clear, it remains a dream for many countries. This is because, even in countries with well-established institutions and legal systems, and the human resources to translate commitment into action, economic reform is a long process that may take more than a decade and is subject to reversal and fragility.

African countries, which are among the poorest in developing countries lack many of the prerequisites such as sustained effort and thus is susceptible to failures. This poses the greatest challenge for these countries with unstable business environment, small markets, mismatch between skills and job requirements, weak supporting infrastructure and very restrictive laws and regulations. Governments in developing countries have to overcome these problems and commit themselves to the above mentioned strategies. By so doing, governments will pave the way to a more productive and competitive private sector.

2.4 TRENDS IN PRIVATE INVESTMENT IN NAMIBIA

Table 3 below shows how investment activity (public and private) evolved over time. This table should be read in conjunction with Figure 1. Trends in investment are an important indicator of the health and vigour of the private sector in a country.

TABLE 3 INVESTMENT - GDP RATIOS (%)

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
GDI/ GDP	14	14.3	15	18.5	22.1	16.7	21.1	22.9	21.9	23.4	22.5
PI/ GDP	6	7	8	12	13.6	9	11.1	14.6	13.5	15.1	17.2
PUB/ GDP	8	7.3	7	6	8.5	7.7.	10.1	8.3	8.4	8.3	5.3

Note: GDI=Gross Domestic investment; PI=Private investment (non-governement investment); Public investment (GDI-PI).

Source: Bouton L, et al (1995), Trends in Private Investment in Developing countries and Namibian authorities.

Gross domestic fixed investment represents expenditure on new durable (except durable consumer goods) and productive assets which have a life expectancy extending beyond the year in which the expenditure takes place and which may, therefore, be expected to contribute to future production processes.

In the Namibian national accounts capital outlays are classified strictly according to the economic activity of the owners (and not users) of the capital assets. Fixed investment in a specific activity includes those outlays by public authorities and public

corporations which reflect that kind of economic activity, as well as the outlays by all private business enterprises engaged in the economic activity concerned.

The average growth rate in the ratio of gross domestic investment to GDP from 1980 to 1989 was about 19.4 percent and increased by 2.1 percentage points to 21.5 percent for the period 1990 to 1996.

Private investment as ratio of GDP in 1980 was 11 percent and thereafter plummeted continuously to 8 percent in 1982 deteriorating to low levels of 6 percent in 1986. In 1987 private investment activity rose to 7 percent of GDP and recorded the highest rate in the decade of about 12 percent in 1989.

The low investment ratio during the 1980s could be attributed to the unfavourable perception the private sector had about the constitutional future of the country. On the other hand, public investment as ratio of GDP declined tremendously from high levels of 16.3 percent and 17 percent in 1980 and 1981 respectively to 10 percent in 1984. The lowest public investment to GDP ratio was recorded in 1989 at the wake of independence, which might signify a pause in public investment activity during the period of transition to democracy [5].

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[5]. The concept of investment pause implies the reaching of a plateau after the initial decline, during which period neither a noticeable recovery nor a further decline takes place.

At independence in 1990, private investment rose to 13.6 percent, while public investment increased to 8.5 percent of GDP. This increase in public investment was higher than recorded in 1989. On average private investment as ratio of GDP increased from 8.2 percent between 1980 and 1989 to about 13.4 percent during the period 1990 to 1996. The increase in the private investment ratio was triggered by the reduction in the ratio of public investment to GDP from 11.3 percent in 1980 to 1989 to a low level of about 8.1 percent for the period 1990 to 1996.

This demonstrates the Namibian government's commitment and determination to reduce its corporate presence and concentrate on creating the environment for a robust and productive private sector.

CHAPTER 3

3.0 LITERATURE REVIEW

This chapter discusses alternative theories of investment and provides an exposition on the macroeconomic determinants of private investment, backed up by empirical evidence in developing countries.

3.1 Theories of investment

There are a number of competing theories of investment behaviour in the literature and it is not clear which one is superior to the other. Therefore, in this section we review only some of the widely discussed theories of investment.

3.1.1 Marginal Efficiency of Capital

Keynes (1936) developed the idea of an independent investment function in the economy. Keynes asserted that investment depends on the prospective marginal efficiency of capital relative to some interest rate, reflecting the opportunity cost of investment. Keynes pointed out that private investment is highly volatile due to the uncertainty associated with the return on investment, which he claims explains the business cycle. Keynes further argued that the main driving force behind the investment decisions is the "animal spirits" of the investors.

The definition of marginal efficiency of capital invokes the present value (PV) criteria of the investment project in which account is taken of an expected stream of future returns associated with a given investment project. This income is then discounted at some appropriate rate of interest. In order to undertake the investment project a certain cost must be incurred to enable comparison between the project cost and its present value which gives a clue about of its profitability.

According to Ott and others (1975), Keynes' marginal efficiency approach was criticized on the basis of the expectation hypothesis and the internal rate of return used for discounting. The investor must form some sort of an expectation hypothesis that enables him to assess the profitability of an investment project based on the future stream of returns associated with the project. However, Keynes did not take explicit account of such an expectation hypothesis which could reflect the investor's concern about the outcome of the possible return streams. To overcome this problem, it was suggested that investors only care about the mathematically expected return of each given date or that the stream of returns represents " certainty equivalents " to the probability distribution, thus requiring that the stream of returns be statistically independent, an assumption which might not be realistic. The Keynesian approach was further complicated by the difficulty in computing the present value of an investment project as a result of the ambiguity about the proper rate to be used for discounting. If we consider a perfect capital market, the market rate of interest will be used which

must be considered as one prevailing for loans of comparable risk. Because the lending rate and the borrowing rate for a firm may vary, one therefore, may have to be careful in selecting the rate of interest which the investor will equate to the marginal efficiency of investment.

3.1.2 Accelerator Theory of Investment

Keynes' ideas were never left unchallenged because in the 1950s and early 1960s other economists formulated models that gave rise to the accelerator theory of investment. This theory assumes investment to be proportional to changes in output, i.e $I = a(Y)$, where I is investment and Y is output (Dornbusch and Fisher, 1994).

The drawbacks of this theory are implicit in its assumptions which are:

(1) *There is a constant ratio of desired capital stock to output.*

(2) *There is sufficient investment to keep desired capital stock to the actual capital stock.*

In the model, a relatively modest increase in the rate of growth of demand for the final good can lead to a large increase in the demand for investment. On the other hand, an actual decline in the demand for the final good produced is not a necessary precondition for a decline in investment. Investment can fall as

a result of a decline in the rate of growth of the demand for the final product.

This assumptions does not augur with real economic activities as it does not take into account the role of expectations, profitability and capital costs which are part and parcel of the investment activity.

According to Wannacott (1978), a number of criticisms have been levelled against the simple accelerator theory. It has been argued by Koyck and others that business adjust their stock of capital only gradually. In Koyck's investment function (**The Flexible Accelerator**), investment makes up only a fraction (β) of the gap between the existing capital stock and the equilibrium desired capital stock.

This can be formally stated as:

$I_{nt} = \beta (\alpha Q_t - K_{t-1})$

Koyck asserted that a disturbance in final demand will have its largest effect during the current period, and the effect will be diminished gradually. This argument served as the basis for the formulation of the flexible accelerator model of investment which can be augmented to capture country's specific features of investment behaviour.

Despite the drawbacks of the accelerator principle, this theory as well as the flexible accelerator principle of investment are popular as evident in most of the empirical studies done to date.

3.3.3 Neoclassical Theory of Business Fixed Investment

This theory was propounded by Jorgenson (1967) and Hall and Jorgenson (1971). The basic premise of the theory is that the desired capital stock depends on the level of output and on the user cost of capital (which in turn is a function of the price of capital goods), the real interest rate and the depreciation rate, which eventually has an impact on private investment behaviour (Branson H.W, 1989). In the model, the firm striving to produce a particular level of output most efficiently will move toward the optimum stock of capital.In a growing economy, with output rising the optimum stock of capital will grow through time. To acquire the changing optimum stock, firms will aim for a continuing flow of investment. Wanacott (1978) stressed that it is inappropriate to look on an equilibrium flow of investment; rather, the flow of investment should be looked upon as the process of adjusting the capital stock toward its desired level.

Although the Neoclassical theory of investment appears to be more comprehensive in its approach , it lends itself to criticisms due to its assumptions of perfect competition and exogenously given output, which are inconsistent with the business cycle. In addition, the assumption of static expectations regarding prices,

interest rates and output are invalid as we know that economic agents have rational expectations about the future.

3.1.4 The Q-theory of Investment

In line with the above theories, Tobin (1969) formulated the Q-theory of investment as an attempt to address the inconsistencies in the Neoclassical theory of investment.

The Q-theory is concerned about how to measure the gap between the desired and actual level of capital stock. Sachs and Larrain (1993) defined the Q-theory as "the ratio of the cost of acquiring the firm capital through the financial market versus the cost of purchasing the firm's capital in the output market". The decision rule for capital accumulation is as follows: If Q>1, it implies that desired capital stock is greater than the actual level of capital stock, therefore it is viable to invest. Conversely if Q<1, that will imply a disincentive towards investment.

3.1.5 Financial Determinants of Investment

In many developing countries 'capital and financial markets are thin or the former is none- existent that private investment accumulation is inhibited. Sachs and Larrain (1993) identified two sources of credit rationing namely disequilibrium interest rate and differential risks.

(a) Disequilibrium interest rate

Interest rates in some developing countries are or have been controlled by the governments, thus putting a ceiling on the

interest rate which must not be exceeded by financial institutions. As a result of the low interest rate and excess demand for money compared to credit availability, financial institutions ration credit to borrowers to the extent that the private sector cannot exploit their full potential due to the limited investible funds.

(b) Differential risks

These situation arises due to the fact that lenders are not always able to assess the risk of defaulting by individual borrowers. Thus, they tend to rely on a few factors such as the size of the business and profitability of the business. Against this backdrop, a larger reputable firm is not likely to face credit constraints compared to a small firm without sufficient credit history.

In the face of credit rationing, firms have to utilize their internal resources (retained earnings) in order to finance investment projects. This is further aggravated by the inability of governments to raise enough savings and thus not to compete too much for financial resources with the private sector.

3.2 MACROECONOMIC DETERMINANTS OF PRIVATE INVESTMENT : Theoretical and Empirical Exposition.

In attempting to redress macroeconomic imbalances, governments usually embark upon restrictive fiscal and monetary policies

supplemented with a real devaluation of the exchange rate. In this section, the most relevant literature, both theoretical and empirical on the macroeconomic determinants of investment are reviewed, focusing attention to the channels and likely effect of different macroeconomic policies on private investment in developing countries.

3.2.1 Monetary policy and private investment

Stabilization programs are usually implemented in order to restrict monetary and credit policies which tend to raise the cost of capital to users by raising the real cost of bank credit, a major source of financing in developing countries and by increasing the opportunity cost of retained earnings. This eventually leads to a decline in investment through both channels. Bier (1992) asserts that under financial repression, interest rates may be a poor proxy for the direction of monetary policy as well as the user cost of capital. Direct credit, according to him, may be more appropriate. This follows from the nature of the banking system in most developing countries in which credit is rationed to borrowers.

Many empirical studies confirm this direct role of credit availability and that financial repression has a negative impact on private investment (for example Oshikoja 1994; Blejer and Khan 1984).

In all these studies, it is evident that the institutional set-up of the financial markets in developing countries is an important ingredient in the transmission mechanisms of monetary and credit policy with respect to private investment.

3.2.2 Fiscal policy, public and private investment

The effects of fiscal policy on economic activity are ambiguous in the theoretical and empirical literature. Other things being equal, a larger budget deficit will crowd out private sector investment by using up the scarce credit available for investment financing and decreasing investment opportunities that would otherwise be available to the private sector. The crowding out of private investment can also feed through higher real interest rates that may act to increase the cost of borrowing. It is important to realize that the way in which a fiscal deficit is corrected has an impact on private capital accumulation. Fiscal adjustment often takes the form of reduced public investment, some of whose components, especially investment in infrastructure such as road and communication, may be complementary with private investment and, thus is likely to have a maximum impact on private investment formation. This view prompted a number of empirical studies to test this positive impact of public investment in infrastructure on private investment.

Blejer and Khan (1984) conducted an empirical study on 24 developing countries and confirmed this hypothesis but that other investments have a negative impact on private investment

activity. However, Balassa (1988) using the same data sets as Blejer and Khan, reported cross sectional statistical results showing that public and private investment are negatively related, with a one percent increase in public investment being associated with a 0.55 decline in private investment.

A direct examination of this issue is provided in a paper on Turkey by Chibber and Van Wijnbergen (1990). This study found strong evidence that non-infrastructural public investment is detrimental to private investment, but no strong evidence to support the positive impact of public investment in infrastructure on private investment. Recent empirical studies [e.g. Shafik (1990) for Egypt and Sakr (1993) for Pakistan] found strong evidence to support the complementary hypothesis.

As can be seen from the above cited studies, empirical evidence remains inconclusive. It is therefore, not clear whether, on balance, increase in total public sector investment raises or lowers private investment. However, the evidence in the studies, though by no means conclusive, support the restructuring of public investment that is occurring in a number of developing countries.

3.2.3 Real GDP growth rates and private investment

Private investment is viewed as being positively related to GDP growth rates. According to Greene and Villanueva (1991), a higher growth rate would increase private investment activity

if the relationship between the level of real output and the desired capital stock is fixed. This was evident in their regression results, confirming the merits of the accelerator principle of investment.

3.2.4 Exchange rate policy and private investment

An important ingredient of most adjustment programs is a real devaluation, aimed at expenditure-switching to complement the expenditure-reducing measures. An objective of a devaluation is to correct an overvaluation, thereby improving external competitiveness by inducing a real depreciation. Real depreciation affects private investment through several channels, not all of which work in the same direction. This is explicit in the arguments of Serven and Solimano (1992).

According to them, a high dependence on imported capital and intermediate goods in total investment would result in a contraction of investment in the face of a real depreciation, while a real appreciation would create an unsustainable investment boom. Also, a depreciation would cause an increase in real debt burden and a decline in the firm's (in the home goods sector) net worth. So, higher variability implies higher uncertainty.

This ambiguity is also evident in other empirical studies. For example, a short-run adverse effect is found by Musalem (1989) for Mexico, Chibber and Shafik (1990) for Indonesia.

Faini and de Melo (1991) used data for 24 developing countries and confirmed the same result. However, all these studies found a positive impact of real depreciation over the long-run.

3.2.5 Macroeconomic instability

High inflation rates and the presence of large external debts are significant sources of instability in the macroeconomic environment with adverse effects on private investment in developing countries as discussed below.

3.2.6 Inflation

The direction of the effects of inflation on investment is ambiguous in both the theoretical and empirical literature. In the context of developing countries inflation may serve as an indicator of the credibility of the government to a stable macroeconomic environment. High rates of inflation increase the riskiness of long-term investment by reducing the average maturity of lending. Against this backdrop, high rates of inflation would be expected to lower private investment. Furthermore, when the rate of inflation is highly variable, it becomes difficult to extract the correct signals from relative price movements and this can lead to an inefficient allocation of economic resources, including capital.

Greene and Villanueva (1991) found a negative and strong effect of inflation in their pooled time series data, indicating that

inflationary policies are generally detrimental to efforts toward increasing private investment.

In the context of African countries, Oshikoja (1994) found a strong negative effect of inflation rates in Cameroon, Malawi and Tanzania, but weak in Kenya, Morocco and Zimbabwe. The coefficients on inflation rates were positive, but insignificant for Mauritius and Tunisia.

We can thus clearly see the ambiguity that abound in the above empirical study. One can therefore, deduce that the impact of inflation on private investment depends on the structural features of the economy of each country.

3.2.7 Debt overhang and private investment

One of the most damaging consequences of the debt crisis has been the collapse of private investment in much of the developing world. A number of transmission mechanisms have been identified in the literature for the negative impact on private investment of large ratios of external public debt to exports.

First, the resources used to service the debt crowd out public investment,which because of the complementarity between public and private investment, discourages private investment.

Second, the external debt ratio could be indicative of "debt overhang", whereby the presence of high debt ratios leads

economic agents to anticipate future tax liabilities for its servicing (see Borensztein, 1990 and Eaton 1987). An empirical study conducted by Oshikoja (1994) on eight African countries confirmed the debt-overhang hypothesis as well as a paper by Greene and Villanueva (1991). Also, Faini and de Melo (1990), by examining the adjustment record for a large sample of developing countries, distinguishing between countries exporting manufactured goods and those exporting primary goods, found strong support for the debt overhang argument. That is, after controlling for other factors, they found that the resumption of private investment growth had been hampered in countries with heavy debt burden and unstable macroeconomic environment.

Finally, it has been argued that uncertainty as regards the future stance on economic policies in response to an uncertain debt service profile would also have negative effects on private capital formation.

3.2.8 Irreversibility and policy uncertainty

The empirical literature on uncertainty and irreversibility still remains very scarce. The key role of uncertainty in investment decisions follows directly from the irreversible nature of most investment expenditures (see Pindyck, 1989). These can be viewed as sunk costs, because capital once installed, is firm or industry specific and cannot be put to productive use in a different activity (at least, without incurring a substantial cost). Such a situation will make the investor sceptical about

the investment process, making them to delay the investment decisions until the "appropriate" time.

One aspect of uncertainty in developing countries, which has recently received a great deal of attention, is uncertainty about future economic policy. For policy reform to be successful all stakeholders in the economy have to respond to the signals generated by the reform.

Policy uncertainty has been much discussed in the context of significant shifts of economic strategy, such as from an inward-oriented, import-substituting approach to a more outward-looking policy based on export promotion. However, if there is a significant probability of a policy reversal, this will act as a kind of tax investment, reducing the expected return (Rodrick, 1991). Investors would then be expected to exercise their option of waiting for new information in an uncertain economic environment.

In such an environment, even small changes in the degree of uncertainty can have large effects on private investment. In contrast, policies perceived to be consistent and reliable may induce a positive response of private investors, thereby reducing the costs of adjustment.

CHAPTER 4

THEORETICAL MODEL, DATA SOURCES AND METHODOLOGY

4.1 Theoretical model

The model of private investment used in this thesis is an eclectic version of the basic accelerator model adapted from Matin and Wasou (1992)[6]. They attempted to assess the determinants of private investment in Kenya and to analyze how adjustment policies (or their absence) affect those determinants. Their model emphasizes the effect of resource constraints on private investment behaviour, including that arising from foreign exchange rationing.

Econometric estimates of the investment model with Kenyan data for 1968-1988 revealed that Kenya's failure to implement adjustment policies after the collapse of the coffee boom and the break up of the East African Common Market reduced private investment sharply in the 1980's. They established that declining real credit to the private sector, falling stocks of public infrastructure capital, and lower availability of imports were the main causes of reduced private investment.

We followed the same strategy employed by Matin and Wasou (1992), but modified the basic accelerator model to provide greater emphasis on the effects of resource constraints faced by private investors in Namibia.

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[6].Matin and Wasou (1992) "Adjustment and Private Investment in Kenya."

The model also incorporates the error-correction mechanism that will enable us to employ new techniques that have emerged in the recent literature on stationarity testing and cointegration.

The accelerator principle assumes that private sector's desired capital stock (K^*_t) is proportional to expected output (Y^e_t) or real GDP.

i.e $K^*_t = a(Y^e_t)$ .....(1)

where " a " is a constant, representing the proportional capital output ratio.

The firm is taken to have a desired level of capital, determined by longrun considerations. Denoting the actual level of capital in period t by K_t and the desired level by K^*_t, capital is adjusted towards its desired level by a certain proportion of the discrepancy between desired and actual capital in each period. This can formally be stated as:

$K_t - K_{t-1} = K^*_t - K_{t-1}$ .....(2)

The flexible accelerator mechanism can be transformed into a complete theory of investment behaviour by adding a model of replacement investment and a specification of the desired level of capital.

A model that has been widely adapted for empirical work is that replacement is proportional to actual capital stock.

i.e $K^*_t - K_{t-1} = I^*_t - \delta K_{t-1}$ .....(3)

By combining the accounting identity given in (2) with the flexible accelerator mechanism in (3), we obtain a model of investment expenditure (gross investment) given by:

$$I^*_t - \delta K_{t-1} = K^*_t - K_{t-1}$$

$$I^*_t = K^*_t - K_{t-1} + \delta K_{t-1}$$

$$I^*_t = K^*_t - (K_{t-1} - \delta K_{t-1})$$

$$I^*_t = K^*_t - (1-\delta) K_{t-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

If we let L be the lag operator then,

$$I^*_t = [1-(1-\delta)L] K^*_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

where δ, is the proportional rate of depreciation which is assumed to be a fixed constant.

We can employ the partial adjustment function to take into account the lags that are involved in the planning, design and implementation of investment projects, which is expressed as :

$$\Delta I_t = \beta (I^*_t - I_{t-1}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The response of private investment to the gap between desired and actual investment, as measured by the coefficient β, is assumed to vary in accordance with economic factors that influence the desired level of investment.

The hypothesis is that the response of private investors to that gap depend on factors given by X_t below:

$$X_t = X(CRP, RER, PUB, \pi, RIR, TOT, RGNP)$$

where, CRP = bank credit to the private sector

RER = real exchange rate

PUB = aggregate public investment

π = inflation rate (INF)

RIR = real interest rate

TOT = terms of trade

RGNP= Real gross national product (real income)

The preferred equation will be derived from a specification search selecting a parsimonious model from a larger set of explanatory variables, by successively eliminating statistically insignificant or implausibly signed regressors. The advantage of this modelling strategy is that it minimizes the occurrence of omitted variable bias.

Taking the factors given by X_t into account, the adjustment coefficient β can be expressed as:

$$\beta=\alpha_0+\frac{1}{I_t^*-I_{t-1}}[\alpha_1 CRP+\alpha_2 RER+\alpha_3 PUB+\alpha_4\pi+\alpha_5 RIR+\alpha_6 TOT+\alpha_7 RGNP] \ldots (7)$$

Substituting equation (7) into (6) we obtain:

$$\Delta I_t=\alpha_0+\frac{1}{I_t^*-I_{t-1}}[\alpha_1 CRP+\alpha_2 RER+\alpha_3 PUB+\alpha_4\pi+\alpha_5 RIR+\alpha_6 TOT+\alpha_7 RGNP](I_t^*-I_{t-1}$$

or

$$I_t-I_{t-1}=\alpha_0(I_t^*-I_{t-1})+[\alpha_1 CRP+\alpha_2 RER+\alpha_3 PUB+\alpha_4\pi+\alpha_5 RIR+\alpha_6 TOT+\alpha_7 RGNP]$$

Then by arranging terms, we obtain:

$$I_t=\alpha_0 I_t^*+\alpha_1 CRP+\alpha_2 RER+\alpha_3 PUB+\alpha_4\pi+\alpha_5 RIR+\alpha_6 TOT+\alpha_7 RGNP \ldots\ldots (8)$$

By combining equations (5) and (1) we get:

$$I^*_t = [1-(1-\delta L]K^*_t = [1-(1-\delta)L]a\ Y^e_t$$

So, we can obtain a dynamic reduced form equation for gross private investment which includes expected real GDP growth rates as follows:

$$I_t=\alpha_0[(1-(1-\delta)L]Y^e_t+\alpha_1 CRP+\alpha_2 RER+\alpha_3 PUB+\alpha_4\pi+$$

$$\alpha_5 RIR+\alpha_6 TOT+\alpha_7 RGNP(1-\alpha_0)I_{t-1}.....(9)$$

Equation (9) can be augmented further for estimation purposes to give the private investment model of this form:

$$I_t=\alpha_0+\alpha_1 LRGDP_t+\alpha_2 LCRP_t+\alpha_3 LPUB_t+\alpha_4 L\pi_t+$$

$$\alpha_5 LRIR_t+\alpha_6 LTOT_t+\alpha_7 LRER_t+\alpha_8 LRGNP+E_{1t}.....(10)$$

To make the regression more dynamic, we introduced the error correction mechanism which led equation (10) to be reformulated as:

$$\Delta I_t = \alpha_0 + \alpha_1 \Delta RGDP_t + \alpha_2 \Delta CRP_t + \alpha_3 \Delta PUB_t + \alpha_4 \Delta\pi_t$$
$$+ \alpha_5 \Delta RIR_t + \alpha_6 \Delta TOT_t + \alpha_7 \Delta RER_t + \alpha_8 \Delta RGNP - \alpha_{10}[I_t - (\beta_1 RGDP + \beta_2 CRP + \beta_3 PUB + \beta_4 \pi + \beta_5 RIR + \beta_6 TOT + \beta_7 RER + \beta_8 RGNP)]_{t-1} + E_{2t}.....(11)$$

The error-correction coefficient, α_{10} shows the strength of adjustment that is transmitted in each period to domestic private investment.

The advantage of the error-correction model is that it does not put a priori restrictions on the model and that it separates long and short run effects (Sjoo,1997).

From equation (11), the following signs are expected:[7]

$\alpha_1>0$, $\alpha_2>0$, $\alpha_6>0$ and $\alpha_8>0$

The signs for the rest of the variables cannot be determined a priori and thus can assume any magnitude, i.e. α_3, α_4, α_5, and α_7. If structural breaks are observed in the series, appropriate dummies will be introduced.

4.2 Definitions of variables and data sources.

This research covers a 27 year period, starting from 1970 to 1996. Annual data on the variables considered in the thesis have been collected from various sources as outlined below:

Private investment (PRIV) refers to investment in outlays, buildings and construction by private investors. Data on private investment has been collected from Ministry of Finance in Namibia as listed in an annual publication entitled Namibian Economic review as well as Trends in Private Investment in Developing Countries (1970-1995).

Public investment (PUB) includes investments undertaken by the government and public corporations. It was sourced from the same publications used for private investment.

Credit to the private sector (CRP) refers to the loans, treasury bills and other monetary instruments granted by financial

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[7]. See literature review for a detailed exposition.

institutions to the private sector. Several issues of annual publications by the Bank of Namibia were consulted for data on this variable.

Real exchange rate (RER) is calculated as a weighted average of Namibia's nominal exchange rate against its major trading partners. Data for this variable was collected from African Development Indicators (various issues) as well as from Namibian Economic Review.

Inflation rate (INF) is calculated as the annual increase in the Consumer Price Index (CPI) and annual data on the CPI were obtained from the Central Statistics Office in Namibia.

Terms of trade (TOT) is obtained by dividing the export price index by the import price index. The effects of changes in TOT on investment works largely through the income effect. An increase in the price of exports relative to that of imports increases real income without affecting output (Mlambo and Elhiraika, 1997). Therefore, improvement in the TOT are expected to have a positive effect on private investment. This variable was sourced from Namibian Economic Reviews (various issues) and African Development Indicator (1997). The 1987 index was used for the calculation of timeseries on inflation, terms of trade and real exchange rate.

Gross domestic product (RGDP) standard macroeconomic textbooks define it as the value of output of final goods and services produced within the country in a given period of time and it is usually recorded on an annual basis. Annual data on this variable were obtained from Namibian Economic Review (various issues).

Real interest rate (RlR) is calculated as; $(1+ LR_{nom} /(1+ INF)-1)$, where LR is the nominal lending rate and INF is the inflation rate. Data on the lending rate were obtained from International Financial Statistics and the Bank of Namibia (various issues). **Gross national product (RGNP)** refers to the value of final goods and services produced by domestically owned factors of production within a given period of time and it is usually recorded on an annual basis. Data for this variable was obtained from Namibian Economic Review (various issues).

4.3 Methodology

The econometric testing of the macroeconomic time series will incorporate stationarity testing and cointegration to avoid the spurious correlations associated with trended time series and to allow for an analysis of the long run equilibrium relationship between private investment and its determinants.

4.3.1 Tests for stationarity

According to Shafik (1990) it is improper to conduct a macroeconomic study without testing for the time series properties of the data. By definition, a time series is stationary if its mean, variance and autocovariances are independent of time. Conversely, the mean and/or variance of a non-stationary process are time dependent.

The unit roots tests that will be considered are the Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) as they enable us to test whether variables are stationary, I(0) or need to be differenced several times I(d) to induce stationarity. However, one has to guard against arbitrarily differencing data as it might lead to loss of long run relationships between variables. These tests are formulated as follows (see, Maddala 1992):

4.3.2 Dickey Fuller (DF)

The test can best be explained by considering three different equations as specified below:

$$\Delta X_t = \delta X_{t-1} + e_t \quad \ldots\ldots(1)$$

$$\Delta X_t = \alpha + \delta X_{t-1} + e_t \quad \ldots\ldots(2)$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \beta_t + e_t \quad \ldots\ldots(3)$$

The difference between the three equations lies in the presence of the deterministic elements α and β_t. The first is a pure random walk model, the second adds a drift term, and the third includes both a drift and linear time trend. All the equations are subject to the null hypothesis that X_t sequence contains a unit root and the error term (e_t) is a white noise process. [(i.e. H_0: $t_\delta = 0$ (non-stationary or unit root)]. However, the critical values of the t-statistics depend on whether an intercept and/ or time trend is included in the regression equation.

4.3.3 Augmented Dickey Fuller Test (ADF)

This test can be stated as follows:

$$\Delta X_t = \delta X_{t-1} + \Sigma_{xi} \Delta X_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (1a)$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \Sigma_{xi} \Delta X_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (2a)$$

$$\Delta X_t = \alpha + \beta_t + \delta X_{t-1} + \Sigma_{xi} \Delta X_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3a)$$

As it can be seen from the above formulation, the ADF follows the same procedure as the DF test, but only differ from the latter in that it considers more lags in order to capture any additional dynamics.

4.3.4 Test for parameter stability

The cumulative sum of recursive residual (CUSUM) and the cumulative sum of residual square (CUSUMSQ) will be used to detect structural breaks if the regression does not contain lagged dependent variables. Alternatively, the Chow test will be used, which is stated as:

$$C = \left(\frac{RSS_T - RSS_1}{RSS_1}\right)\left(\frac{T-K}{T_2}\right)$$

where C is distributed as F statistic, $F(T_2, T_1-K)$ RSS_T is the residual sum of squares for the model estimated over the whole sample period, RSS_1 is the residual sum of squares over the period T_1 observation; (i..e T_1 is the number of observations before the break period, the one with more observations). T is the total number of observations, so that $T_2 = T-T_1$. C is the test statistic for parameter constancy (which also tests for the constancy of the error variance).

The null hypothesis of parameter constancy is rejected if the tabulated F is greater than C.

4.3.5 Tests for cointegration

It is a generally accepted proposition that most macroeconomic timeseries display non-stationary trends. Thus integrated or near integrated regression with these variables leads to the danger of non-standard distributed parameter estimates which makes inference much more difficult. Such regressions leads to spurious regression problem. One way to avoid spurious regression is to ascertain whether the time series are cointegrated. This occurs when the linear combination of two variables are stationary such that they will be on the same wavelength if they are integrated of the same order (Maddala,1992).

There are a number of cointegration tests such as the Johansen procedure which is a large sample estimation procedure and consequently could not be employed in this study. Therefore we considered the Engle and Granger two-step procedure due to data limitations.

4.3.6 The Engle and Granger two-step procedure

The first step of this test involves exploring the levels or equilibrium part of the error-correction model to establish whether the variables cointegrate. Essentially, we have to save the residuals from OLS applied to the series on levels. Due to

the properties of super converge (merging) the estimated parameters can be viewed as an estimate of the long run and the residual (lagged once) can be used as an error term (Sjoo, 1997). Evidence of cointegration includes a high R^2 at the levels stage, significant coefficients, a significantly non-zero cointegrating Durbin-Watson (DW) statistic and significant DF and ADF tests on the residual from the levels regression.The null hypothesis for this test is that the estimated error term has a unit root and the alternative is that the variables are cointegrated. With cointegrating variables, the coefficient estimates from this levels regression can be interpreted as the long-run multipliers.

The second step, in the two step-procedure is to test for a unit root in the residual of the cointegrating regression obtained in the first step.In this case the lagged residual from the long run regression has to be included in the equation with differenced variables to form the Short run Dynamic model or error-correction model which validates the long run estimates in the event of rejection of the null hypothesis that the residual has a unit root.

CHAPTER 5

ANALYSIS AND INTERPRETATION OF REGRESSION RESULTS

In this chapter, we will first discuss the unit root tests performed on the variables at the levels and difference stage. Secondly, an analysis of the results of the long run model will be presented and this will culminate in the analysis of the results from the short run dynamic model with special emphasis on the role of the error-correction mechanism.

5.1 Stationarity testing

Before undertaking the regression of the private investment model, we tested the timeseries characteristics of the data. This is necessary in order to avoid the spurious correlations associated with trended timeseries. In this regard we employed the Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) to establish the order of integration and the results of both test are presented in Table 4 for the variables at the levels and difference stage, respectively. It is worth noting these denotations:

Lpriv = Log of private investment

LPUB = Log of public investment

LCPI = Log of inflation

LTOT = Log of terms of trade

LCRP = Log of credit to the private sector

LRGDP = Log of real GDP

LRER = Log of real exchange rate

LRIR = Log of real interest rate

LRGNP= Log of real GNP

TABLE 4. Unit root tests of variables

		DICKEY FULLER (DF)		AUGMENTED DICKEY FULLER (ADF)	
Variable	Order of Integration	Without trend	With trend	Without trend	With trend
LPRIV	NS	-1.7667 (-2.9798)	-1.8218 (-3.5943)	-2.5874 (-2.9850)	-2.6187 (-3.6027)
DLPRIV	I(1)	-4.1180 (-2.9850)	-4.1392 (-3.6027)	-5.3637 (-2.9907)	-5.2986 (-3.6119)
LPUB	NS	-0.65593 (-2.9798)	-3.3692 (-3.5943)	-0.86891 (-2.9850)	-2.3717 (-3.6027)
DLPUB	I(1)	-5.9903 (-2.9850)	-5.8524 (-3.6027)	-3.9894 (-2.9907)	-3.8766 (-3.6119)
LINF	NS	-2.29798 (-2.9798	-2.0573 (-3.5940)	-2.1398 (-2.9850)	-1.6036 (-3.6027)
DLINF	I(1)	-8.1174 (-2.9850)	-8.4246 (-3.6027)	-3.3627 (-2.9907)	-3.6027 (-3.6934)
LCRP	NS	-1.0536 (-2.9798)	-0.98419 (-3.5943)	-1.3044 (-2.9850)	-0.93967 (-3.6027)
DLCRP	I(1)	-4.7459 (-2.9850)	-5.2888 (-3.6027)	-3.1896 (-2.9907)	-3.7872 (-3.6119)
LRIR	NS	-3.2906 (-2.9798)	-4.6494 (-3.5943)	-1.5379 (-2.9850)	-2.7786 (-3.6027)
DLRIR	I(1)	-7.1082 (-2.9850)	-7.0689 (-3.6027)	-4.0829 (-2.9907)	-4.1080 (-3.6119)
LTOT	I(0)	-3.2992 (-2.9798)	-3.1367 (-3.5943)	-3.9297 (-2.9907)	-2.9644 (-3.6027)
LRER	NS	-.035526 (-2.9798)	-2.2247 (-3.5943)	-0.21644 (-2.9850)	-2.5027 (-3.6027)
DLRER	I(1)	-3.8863 (-2.9850)	-4.5943 (-3.6027)	-3.6528 (-2.9907)	-4.9424 (-3.6119)
LRGDP	NS	-3.4075 (-2.9850)	-1.8333 (-3.6027)	-1.9888 (-2.9850)	-2.5258 (-3.6027)
DLRGDP	I(1)	-3.4567 (-2.9850)	-4.8544 (-3.6027)	-3.5930 (-2.9907)	-3.9888 (-3.6119)
LRGNP	NS	-2.4681 (-2.9798)	-0.64852 (-3.5943)	-2.2698 (-2.9850)	-0.63030 (-3.6027)
DLRGNP	I(1)	-3.8115 (-2.9850)	-3.7064 (-3.6027)	-3.2395 (-2.9907)	-3.1119 (-3.6119)

At 5 % significance level, NS denotes non-stationarity at the levels stage for convenience, i.e that the variables are having unit roots.

Rao (1994) noted that the augmented Dickey Fuller (ADF) and cointegrating regression Durbin-Watson (CRDW) tests perform best in terms of power but that the critical values for the CRDW are not sufficiently constant across the various experiments for the test to be practicable. Therefore, the (ADF) test is to be preferred.

The DF and ADF (from Mfit3, version 286) with and without trend shows that LPRIV is non-stationary at the levels stage as the critical values (between brackets) are less than the computed statistics (outside the brackets) at the 5% level of significance. The first difference of LPRIV produced a stationary series, resulting in an I(1) series. This also holds for LPUB, which became stationary after first differencing. Thus, both LPRIV and LPUB are integrated of order 1. The rate of inflation (LINF) has unit root at the levels stage and we induced stationarity in the series as revealed by DF and ADF tests with and without trend after first differencing, for it to become integrated of order one, i.e I(1) series. These tests also show that LRER, LCRP, LRGNP and LRIR accepted stationarity after differencing the series once. Therefore, all these variables are integrated of order one, that is they are all I(1) series.

Conversely, LRGDP is non stationary in levels, but accepted stationarity after first difference as revealed by the ADF test with trend. Thus, LRGDP is also integrated of order one.
The only exception is LTOT, which is stationary in levels as shown by the ADF with trend, therefore LTOT is an I(0) series.

As can be seen, most variables are non-stationary in levels and this facilitates cointegration analysis, because stationarity can be induced after the first difference of the series. The unit root tests are crucial in that they allow regressions with stationary series, which can produce reliable estimates.

After determining the order of integration of the variables, we proceeded with the longrun regression by employing the Engle and Granger two step-procedure through which we could establish whether the variables are cointegrating or not.

5.2 Cointegration testing

The importance of cointegration analysis lies in the fact that it provides a powerful discriminating test for spurious correlation. Thus, conducting cointegration analysis between apparently correlated I(1) series and establishing cointegration validate the regression. Whereas, failing to find cointegration is indicative of spurious correlation between the series which ultimately invalidates inferences drawn from such correlation.

The presence of cointegration implies that even if the dependent and the independent variables are non-stationary, the residuals from the estimation of the equation are stationary (Engle and Granger, 1987). According to them, if there is cointegration, the equation with non-stationary variables is best estimated by the error- correction model (ECM) for long run and short run dynamics. The error-correction model serves as a feedback

mechanism as it allows the exploitation of information on the long run relationship between non-stationary series within a stationary and therefore statistically consistent model (Adam, 1992).

The aim of the Engle and Granger two-step procedure employed in this study is to determine the short and longrun multipliers of private investment behaviour. This procedure, though not the best, is popular with small sample size regressions (see, for example Shafik 1990, Jenkins 1998 and Sowa 1996).

The first step of the Engle and Granger procedure involves the inclusion of all the variables that are having unit roots at the levels stage and then examining the timeseries characteristics of the residuals from that regression. If the residual from the levels stage regression is stationary, then cointegration between the variables may be accepted.

The levels stage regression gave us the following longrun equation recorded in Table 5 of the form:

$$LPRIV_t = \alpha_0 + \alpha_1 LRGDP_t + \alpha_2 LCRP_t + \alpha_3 LPUB_t + \alpha_4 LINF_t + \alpha_5 LRIR_t + \alpha_6 LRER_t$$

Table 5. Long run Private investment Model

Regressor	Coefficient
Constant	9.3910
	(-6.3877)[8]
LPUB	1.1922
	(4.8735)
LRGDP	1.0585
	(4.8095)
LCRP	0.66216
	(3.5156)
LRER	0.84687
	(3.6766)
LINF	-0.61879
	(-2.1818)
LRIR	-0.07458
	(-1.5549)
R^2	.719
R^{-2}	.635
DW-statistics	
1.9502	
F-statistics	
(6,20) 8.5418[0.000]	

[8] Figures in parenthesis are "t"- statistics. Shafik (1990)noted that because of autocorrelation of the residuals, the "t"statistics from the levels regression are biased upwards and therefore it is not possible to assess the true significance of the coefficient estimates. "However, it is possible to accept the significance of coefficients at the levels stage since if a variable is insignificant when"t" statistics are upwardly bias, it will certainly be insignificant for the true value of the t-statistics".

It can be seen from Table 5 that the variables are jointly significant at the 1% level of significance as indicated by the F-statistics of 8.5418. The DW-statistics of 1.9502 is close to two, thus indicating minor autocorrelation problems.

Overall, the diagnostic tests **(shown in Table A in the appendix)** of the model are good as they do not show any problem with functional form and normality. However, the model seems to suffer from serial correlation and heteroscedasticity problems though not highly significant in magnitudes.

A plot of the CSUM for systematic changes and CSUMSQ for recursive residual showed no structural breaks, which confirms the stability of parameters as indicated by the diagnostic tests of the model. Figure 2(a) and (b) in the appendix provides evidence on the absence of structural breaks in the model. This can be observed from the graphs that shows the structural breaks as they do not cross the critical bounds at the 5% significance level.

Specifically, the regression result suggests that public investment, credit to the private sector, real GDP growth, real interest rate, inflation and real exchange rate are the long run multipliers of private investment in Namibia. This implies that an increase in the growth rate of all the other variables except inflation and real interest rate will have a positive impact on private capital formation in Namibia.

Whereas, an increase in inflation and real interest rate may deter private investment accumulation in Namibia in the long run with the former exerting the largest negative impact. The real income variable (LRGNP) was not significant in the regression and its inclusion only led to an improvement in the explanatory power of the regression estimates. This finding rendered the terms of trade variable (LTOT) as it was stationary at the levels stage and LRGNP due to its insignificant role in explaining private investment behaviour in the long run inappropriate in forming the cointegrating vector.

Generally, the positive impact of public investment (LPUB) on private investment is expected because of the existence of a well developed physical infrastructure in Namibia. Thus, the infrastructure in turn provide the necessary incentive for the private sector to increase its productive capacity as evidenced by the elasticity coefficient of one on the output variable (LRGDP).

Depreciation of the real exchange rate is likely to stimulate private investment by improving the international competitiveness of the country. This will be the case particularly when it is accompanied by an increase in domestic credit extended to the private sector.

The real interest rate appears to exert a negligible negative impact on private investment in the long run. This result suggest that financial deepening is playing a dominant role over

financial liberalization in Namibia. Therefore, one may conclude that financial deepening is more important in stimulating private investment in Namibia.

After having obtained the long run multipliers of private investment behaviour, we saved the residual from this estimates to represent the error-correction mechanism.

The unit root tests for the residual is reported in Table 6.

Table 6. Unit root test for residual

DICKEY FULLER		AUGMENTED DICKEY FULLER	
Without trend	With trend	Without trend	With trend
-5.0517 (-2.9798)	-4.9216 (-3.5943)	-3.7286 (-2.9850)	-4.5866 (-3.6027)

At 5 % significance level

The DF and ADF tests, with and without trends indicates that the residual produces a white noise process in that the computed statistics are greater than the critical values which are shown in brackets. This suggest, that there is a long run relationship between the dependent and independent variables and that the variables are cointegrated.

This concludes the first step of the Engle and Granger procedure. The second step of this procedure is reflected by the inclusion

of the one period lagged residual in the difference equation to give us the short run dynamic model of private investment.

5.3 Short run Dynamic Private Investment Model

Table 7, presents the results from the short run dynamic equation, based on equation 11 of the theoretical model of private investment which is in fact an overparameterised version of the model. In the estimated model, private investment is expressed as a ratio of GDP and the regression is formulated in log-linear form so that the coefficient can be interpreted as elasticities. The regression with the overparameterised model which included one lag of each variable produced insignificant t-ratios for most of the variables attributable largely to the loss of degrees of freedom given the small sample size. LTOT and LRGNP were also included in the regression but as with the long run estimation these two variables turned out to exert no significant impact on private capital formation. Consequently, LTOT and LRGNP were dropped from the model.

The preferred model of private investment took the following form:

$$\Delta LPRIV = \beta_0 + \beta_1\ \Delta LRGDP + \beta_2 \Delta LCRP + \beta_3\ \Delta LPUB + \beta_4\ \Delta LINF + \beta_5\ \Delta LRIR + \beta_6\ \Delta LRER(-1) + RES(-1) + \beta_7\ \Delta LPRIV(-1)$$

The lagged residual, RES(-1) representing the error-correction term is expected to have a negative sign as it capture the process by which agents adjust to the long run equilibrium.

Table 7. Short run Dynamic Private Investment Model

Regressor	Coefficient
Constant	0.13619
	(0.92534)
DLPUB	0.44378
	(6.2580)*
DLINF	-0.8851
	(-1.4908)**
DLRIR	-0.1999
	(-2.0146)*
res(-1)	-0.65910
	(-4.9685)*
DLRER(-1)	-0.03954
	(2.2721)*
DLCRP	0.33619
	(1.6542)**
DLRGDP	0.5591
	(1.6613)**
DLPRIV(-1)	0.25960
	(2.2125)*
R^2	.795
R^{-2}	.692
DW-statistics	2.0738
F-Statistics (8,16)	7.7391[0.000]

Note: The Figures in parenthesis are t-statistics. One asterisk denote significance at the 5% level, while two asterisks denotes significance at the 10% level. The letter D represents the difference of the variable.

The model tests are not significant starting with the Lagrange multiplier (LM) test of serial correlation, the ARCH test for heteroscedastic errors, the Jargue-Bera normality test for the distribution of the residuals and the Ramsey RESET test based on the regression of squared residuals fitted values for the regression specification (**see Table B in the appendix**).

The adjusted R^2 which takes the degrees of freedom into account, shows that about 69% of the variation in private investment are explained by the regressors.

The DW- statistics of 2.0738 indicates the absence of autocorrelation problems in the model and that there are no significant outliers in the model.

Further, the plot of the CSUM and CSUMSQ presented in Figures 3(a) and (b) in the appendix revealed no presence of structural breaks which implies that the economy has not been subjected to severe shocks during the period under review.

It is evident from the regression results that public investment exerts a strong and positive impact on private investment. Ceteris paribus, a one percentage point increase in public investment will lead to a 0.44 percentage rise in private investment activity.

Private investment seems to respond slowly to a depreciation of the exchange rate becuase it became significant only after one

lag was introduced to the series. The real exchange rate variable appeared with a negative coefficient, implying that depreciation of the Namibian dollar discourage private investment in the short run. Mlambo and Elhiraika (1997) in their pooled timeseries data on SADC countries also found a similar result for Swaziland (its currency is also pegged to the South African Rand) and South Africa which were among the SADC countries included in this study. This negative effect might occur through a reduction in demand as depreciation will tend to raise overall prices in the economy in the short run. This is especially true in the case of a small and importing country like Namibia whose imports are having a large capital content. However, the impact appeared to be small as indicated by the elasticity coefficient of 0.04, implying that the depreciation of the exchange rate will reduce private investment by about 4% when disregarding the impact of other variables.

The error- correction term (res-1), lagged one period, shows a strong, albeit negative and significant coefficient, suggesting that agents adjust for expectational errors about the equilibrium relationship in the previous period. This is shown by the elasticity coefficient which implies that there is a 65 % feedback from the previous period into the short run dynamic process.

An increase in the real interest rate, exerts a negative impact on private investment in the short run. The coefficient on the real interest rate shows that, holding other variables constant

a percentage point increase in the real interest rate will reduce private investment by about 0.20 percentage points. Mlambo and Elhiraika (1997) from their pooled timeseries maintain that liberalisation has had no impact on private investment in the SADC region. Contrary to them, our result suggest that real interest rate exerts a minimal impact on private investment in Namibia. Their findings is not strange because their study was based on pooled timeseries and in this case we are dealing with a specific country in which their general result may not hold.

Credit to the private sector has a positive impact on private investment, yielding a statistically significant coefficient at the 10% level of significance. This implies that more credit which in the past favoured the public sector should be directed towards the development of the private sector. This corroborates the results by Mlambo and Elhiraika (1997) that financial deepening is more important in stimulating private investment in the SADC region.

Following Shafik (1990), private investment was lagged one period back, possibly to capture further lags of the regressors that could not be included in order to preserve degrees of freedom, given the limited sample size. Contrary to Shafik (1990) this variable appeared with a positive and significant coefficient at the 5% level of significance. The coefficient of this variable, may also suggest that investment projects undertaken in the past can exert a positive externality on private investment activity in that it may positively affect private investors perceptions

about the investment climate and benefits accruing from investment.

An increase in real output exerts a positive impact on private investment as it is significant at the 10% level of significance. Thus expansion of the production capacity of the economy will stimulate private investment and this can be magnified by depreciation of the real exchange rate. Taking the positive impact of the depreciation of the exchange rate on private investment in the long run as noted earlier into account, the result suggest that private investors responds positively to the depreciation by increasing output in the productive sector of the economy.

The inflation rate, though not highly significant at the conventional levels, indicates that an increase in its level will have a negative impact on private investment in the short run. The magnitude of the coefficient of DLINF, suggests that investors respond fast to short run fluctuations in inflation thus leading to a decline in private investment.

Finally, we can deduce the relative importance of the variables in the short run dynamic model by examining the elasticity coefficients on the variables. The results suggests that DLINF has the greatest magnitude in affecting private investment behaviour in the short run.It is followed by DLRGDP, DLPUB, DLCRP and DLRIR, with an increase in the levels of public investment, real GDP growth and credit to the private sector exerting a

positive impact on private investment. However, an increase in inflation and the real interest rate deters private investment.

DLRER has the least magnitude and thus appear to be less important in affecting private investment behaviour in the short run. An interesting feature can be observed when comparing the elasticity coefficients of inflation to that of the real interest rate. It is evident that inflation plays the dominant role in inhibiting private capital formation in the short run. Therefore, there is a need to contain the variability in the inflation rate as it may discourage private sector development over the long run.

CHAPTER 6

CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Conclusion

This study identified the major determinants of private investment as being, public sector investment, credit to the private sector, inflation rate, real GDP growth, real exchange rate and real interest rate.

First, public investment always appeared with a positive coefficient in both the short and long run estimations. This suggests that the Namibian government undertook investment projects (notably infrastructural) that were complementary to private sector development. Thus, against this backdrop we could not reject the "crowding in" hypothesis and may conclude that public sector investment crowds in private investment in Namibia. This confirms similar findings by Oshikoja (1994) from pooled data which included Morocco and Mauritius as the middle income countries.

Secondly, the volumes of credit granted to the private sector has proved to be one of the major determinants of private investment accumulation in Namibia. It is significant in both the short and long run dynamic models. This lends itself to support the popular view that more credit should be channelled towards activities aimed at private sector development if the private sector is to be the impetus for economic growth. Jenkins (1998) provide

similar evidence on the role played by domestic credit in fostering private sector development in Zimbabwe.

Thirdly, private investment is positively related to real output. This hypothesis holds for Namibia in the short and long run, thus suggesting that an increase in real output will exert a positive impact on private investment due to the exploitation of economies of scale in the productive sector of the economy in the long run. Real GDP growth rate, as in other studies, confirm the view that countries which produce and export more have greater chance to develop the private sector.

The positive coefficient on real GDP is consistent with the predictions of the accelerator model as indicated by the elasticity coefficients of 0.55 and 1.0585 in the short and long run, respectively. Greene and Villanueva (1991) found similar evidence in their study on private investment in selected developing countries.

Fourthly, macroeconomic instability, proxied by the variability of the inflation rate deters private investment activity in Namibia in the short and long run. The rate of inflation also serves as indicator of government commitment to policies. Thus the highly variable the inflation rate is, the more sceptical investors will be about government's commitment to macroeconomic policies. Conversely, a high inflation rate may erode the purchasing power of money by increasing the cost of both imported and domestically produced goods.

In addition, Namibia due to its CMA-membership, is "importing" inflation[9] from South Africa which controls monetary policy that have to be applied in Namibia. Even though the Namibian inflation rate is low by the standard of developing countries, its variability may send wrong signals about domestic prices to the private sector. Therefore, investors may be facing uncertainty about the inflation that will prevail in the next period. In view of these factors, risk averse investors will tend to adopt a wait and see attitude which may deter the development of the private sector in Namibia. Mlambo and Elhiraika (1997) confirmed similar findings from their pooled timeseries for selected SADC countries which excluded Namibia and Lesotho, but included Swaziland and South Africa all belonging to the Common Monetary Area.

Finally, depreciation of the exchange rate stimulates private investment in Namibia. This hypothesis could not be rejected in the long run model. However, the elasticity of the negative short run impact was smaller compared to that of the long run, thus implying that more benefits from depreciation of the exchange rate will be reaped in the long run.

The South African Rand to which the Namibian dollar is pegged have been overvalued historically and this may place the trade competitiveness of the Namibian economy at risk. Thus, depreciation of the exchange rate to an "acceptable level" will be the right move towards private sector development in the long

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[9] No attempt has been made in this study to assess the extent of the inflation spillovers emanating from the South African economy.

run. Moreover, this will assist in ensuring an adequate level of foreign capital inflows, not only to mobilize domestic savings, but more importantly to import capital goods which are necessary for the processes of production and the acquisition of technological capabilities and managerial competence. Solimano (1990) and Chibber and Shafik (1990) established that depreciation of the exchange rate exerts a positive impact on private investment in the long run, while adverse consequences may be prevalent in the short run. A stable exchange rate is an indicator of government commitment to trade policy, because a highly variable exchange rate will lead to uncertainty about prices that will prevail in the domestic and world markets. Thus, the Namibian government should be cautious about the exchange rate policy dictated by South Africa as the dominant partner in the CMA as it may have negative repercussion emanating from fluctuations in South African macroeconomic policies that may have been initially perceived to be credible. A case in point is the sudden devaluation of the South African Rand in 1997 to about 4.9 Rand to 1 US $ which in part was attributed to the announcement of the health status of the South African President. These and other factors, may affect the investor's perception about the stability of the Namibian dollar and may, due to the irreversible nature of investment projects increase the option value of waiting which in the final analysis can be detrimental to private sector development. In case of prolonged fluctuations in the exchange rate, Namibian authorities should consider the delinking of the Namibian dollar from the South African Rand. However, this is a serious issue because policy makers have to

weigh the costs and benefits that accrue from CMA- membership, against short and long-run benefits which may be derived from a stable exchange rate, especially in the tradeable goods sector. Namibia currently has embarked upon an aggressive campaign to develop the private sector, aiming at mobilizing both domestic and foreign investors to achieve its objectives. To this respect, it has published a document in 1992 entitled " Investment Opportunities in Namibia" in which estimates were made of the costs and benefits that investors will derive from certain projects. Special incentives are also provided to foreign investors such as the repatriation of their capital and the Export Processing Zone established in 1994 also provides facilities that encourage the export drive.

The above mentioned factors also tie well with the monetary policy on which Namibia can not exercise control. The interdependence of the financial institutions in Namibia and South Africa, also contributes to uncertainties as regards the real interest rate, which is used as the cost of borrowing, to the extent that commercial banks in Namibia often follows the lending and deposit rates that prevail in the South African money market. Due regard has to be accorded to domestic economic conditions such that financial institutions in Namibia should not just follow the same interest rate pursued by financial institutions in South Africa as it may be detrimental to private sector development in the long run. In this regard credit ceilings favouring the private sector may be imposed on domestic

credit in order to regulate the interest rate that should prevail in the money market.

Consequently the central message conveyed in this study is that the maintenance of a stable macroeconomic environment is crucial to efforts aimed at encouraging private investment and thus toward laying the foundation for sustained economic growth in Namibia.

6.2 Policy recommendations

The findings of the study suggest that the Namibian government should adopt a well planned privatization programme that will lead to the privatization of public corporations that are directly competing with the private sector in the productive sector of the economy.

Although Namibia has recently embarked upon a commercialization programme, which converted public corporations such as Namibian Broad Casting Corporation, Telecommunication and Namibian Electrical Corporation into parastatals, the government has to play watchdog and see to it that transparency and efficiency prevail. However, in case of inefficiencies the government has to consider a full privatization programme of similar entities as it will lead to high borrowing requirements from the public sector. In such a situation, the public sector will compete with the private sector for domestic credit resulting in either a high

interest rate and/or increase budget deficits that can have a negative impact on private investment.

If the private sector is to play the major role in economic growth and development, it must receive the greatest share from the volume of domestic credit. In this regard, the banking and financial institutions should devise mechanisms that will enable them to render the services efficiently even to investors in small scale industries in remote areas as it currently extends credit on a short-term basis, favouring established firms. Therefore, financial institutions need to bring the services closer to investors by establishing branches in remote areas, because commercial banks are only concentrated in the major towns of the country to date. Informal financial arrangements have served as sources of finance to small and medium scale investors, but they have proved insufficient in meeting the needs of these industries. Thus, efforts should be directed on upgrading informal financial arrangements and strengthening their links with formal institutions, such as commercial banks and Namibian Development Corporation (NDC), that have provided financial support to large numbers of clients on a sustainable basis.

The real interest rate, is normally not expected to play a significant role in decision making about credit obtained from the financial institutions in most developing countries (Blejer and Khan, 1984). Contrary to this observation, the regression results showed a negative impact on private investment of an increase in real interest rate in the short and long run. However

it was not highly significant in the long run regression but it underscores the negative effect it may have on private investment in the long run. This results imply that private investors are sensitive to increases in the real interest rate.

Financial institutions do not seem to provide "sufficient" starting up capital for investment projects and this together with high real lending rates tend to inhibit private investment in Namibia. This has led to an increase in the private saving to GDP ratios from 3.3% during the 1980s to 3.8% during the 1990s. The real interest rate could also be viewed as capturing the effects of financial deepening in Namibia, which is positive when there is a wide spread between the lending and deposit rates. This is the case for Namibia as the interest rates are determined by market forces. Thus, macroeconomic policies that foster market related interest rates through financial liberalization would improve private saving and investment.

The real exchange rate should be depreciated toward a more depreciated equilibrium level in order to improve the trade competetiveness of the economy. The Namibian authorities should be committed to maintaining a stable exchange rate and low inflation rate, because high fluctuations in both rates will lead to macroeconomic instability with the resultant distortion in domestic and foreign prices. Government credibility with regard to the maintenance of macroeconomic policies will also be at stake to the extent that any deviation from the documented policies will have an adverse impact on private investment.

In fact for effective control of inflation, the government should continue to monitor the growth of the money supply, especially given the long run adverse impact of uncontrolled monetary growth on private investment. Thus, efforts should be geared towards keeping the inflation rate low (by incurring a sustainable fiscal deficit) and maintaining a stable and predictable exchange rate. Namibian post-independence external debt has been rising sharply and this trend is likely to create inflationary expectations and macroeconomic uncertainty regarding future returns to private investment and in the end retard development of the private sector because a high proportion of the forthcoming returns must be used to repay the existing debt.

The quantity of domestic output should be expanded as it will increase the profitability of the firms, especially those that are producing tradeable goods. This can be enhanced through the provision of the right incentives to the private sector such as by improving trade competitiveness, tax policies, trade policies and key prices in the economy.

Finally, the results though by no means conclusive, suggest that the Namibian authority should aim at maintaining macroeconomic stability in order to boost private sector development. These will be derived from a low and stable inflation rate, stable exchange rate, reduction in unemployment level brought about by increased private sector activity and by limiting the role of the public sector to the provision of essential services that do not compete with the private sector for scarce credit. The

achievement of these requirements will pave the way for a productive and competitive private sector in Namibia.

REFERENCES

African Development Indicators, Year book, Various issues.

Adam, C.(1992) "Recent Development in Econometric methods: An application to the demand for money in Kenya," AERC special paper no. 15

Aron, J and Ayogu, M (1997) "Foreign Exchange Market Efficiency Tests in Sub- Saharan Africa" Journal of African Economies, Supplement to Volume 6, No.3.

Bank of Namibia , Annual reports(various issues)

Balassa, B. (1988), "Public Finance and Economic Development," PPR Working Paper No.31, The World Bank.

Bier, W (1992), "Macroeconomic Models for the PC" IMF Working Paper 92/110 (December).

Blejer M.I and Khan M.S (1984), "Government Policy and Private Investment in Developing countries", IMF Staff papers, Vol.31, 1984.

Borensztein, E (1990), "Debt overhang, Credit Rationing and Investment", Journal of Development Economics, Vol 32 (April).

Bouton, L and Sumlinski and M. A (1995), "Trends in Private Investment In Developing Countries" IFC Discussion paper, no. 31.

Branson, H. W.(1989) " Macroeconomics, Theory and Practice," Third edition, Princeton University.

Brown, S. W.(1988) edition "Macroeconomics" University of Puget Sound, Tacoma, Washington.

Chibber, A and Shafik, N (1990) "Does Devaluation Hurt Private Investment: The Indonesian Case," PPR Working Paper No. 418, World Bank.

Chibber, A and Mansoor, D (1990) "Fiscal Policy and Private Investment in Developing Countries, Recent Evidence on Key selected Issues" WPS No. 559, World Bank.

Chibber, A and Van Wijnbergen,S (1990), "Public Policy and Private Investment in Turkey", PPR working paper No. 31. The World Bank.

Dornbusch, R and Fisher, S (1994) " Macroeconomics" Sixth edition.

Eaton, J (1987), "Public Debt Guarantees and Private Capital Flight", World Bank Economic Review, Vol. 1 (May), pp.377-95.

Engle, R.F and C.W.J. Granger (1987) "Cointegration and Error Correction: Representation, Estimation and Testing" Econometrica, 55:22

Fani, R and de Melo, J (1990), "Adjustment, Investment and the Real Exchange Rate in Developing countries, WPS 473, The World Bank.

Granger, C.W.J (1986) " Development in The Study of Cointegrated Economics Variables" Oxford Bulletin of Economics and Statistics, Vol. 48, No.3.

Greene J and Villanueva D. (1991), "Private Investment in Developing Countries: An Empirical Analysis", IMF Staff Papers Vol 38 (March), pp.33-58

Hadjimichael T. M, Ghura D, Muhlsen N and Ucer M (1995) "Sub-Saharan Africa; Growth, Savings, and Investment, 1986-93" IMF Occasional Paper 118.

International Monetary Fund, International Financial Statistics (IFS) Year Book (various issues)

Jenkins, C (1998) "Determinants of Private Investment in Zimbabwe" Journal of African Economies, Volume 7 No.1.

Maddala, G.S (1992) Introduction to Econometrics (2nd ed.) Macmillan, New York.

Martin, M. K and Wasou, B (1992) "Adjustment and Private Investment in Kenya," Policy Research Working papers, WPS No.878.

Ministry of Finance (Namibia) " Namibian Economic Review" Various issues.

Mlambo, K and Elhiraika, A. B (1997) "Macroeconomic policies and Private investment in SADC countries", African Development Bank, ERP no.33

Musalem, A (1989), "Private investment in Mexico: An Empirical Analysis", PRF Working Paper 183, World Bank.

Oshikoja W. T (1994), "Macroeconomic Determinants of omestic Private Investment in Africa: An Empirical Analysis", Economic Development and Cultural Change, Vol 42 (April), pp.573-96.

Ott, J.D, Yoo, H.J and Ott, F.A (1975) edition "Macroeconomic Theory" USA: McGraw-Hill inc.

Ozler, S and Rodrick, D (1992), External shocks, politics and Private investment: Some Theory and Empirical evidence, Journal of Development Economics, Vol 39 pp.141-162.

Pindyck, R. (1989), Irreversibility, Uncertainty and Investment, WPS 294.

Rao, B. B (1994) edition "Cointegration for the applied economist"

Rossow, J (1997) " The Namibian Economy," Huysamer Stals, (Pty) Ltd.

Sachs, J. D and Larrain, F. B (1993) edition "Macroeconomic In The Global Economy" Harvester Wheatsheaf.

Sakr, K (1993), "Determinants of Private Investment in Pakistan", IMF Working Paper 93/30, March.

Serven, L and Solimano, A (1992), "Private Investment and Macroeconomic Adjustment:A Survey", The World Bank Research Observer, Vol 7 (January) pp.95-144.

Shafik, N (1990), Modelling Investment Behaviour in Developing Countries: An Application to Egypt, WPS 452.

Sjoo, B (1997) Lectures in Economic Time Series Modelling, extracted from an unpublished textbook, " A Guide to Testing for Unit roots and Cointegration" presented at the 1997 Joint Facility Electives(JFE) for the Masters Degree-Collaborative programme held in Nairobi, Kenya.

Solimano, A. (1990) "How Private investment Reacts to Changing Macroeconomic Conditions: The case of Chile in the 1980s," PPR Working paper No. 212, The World Bank.

APPENDIX

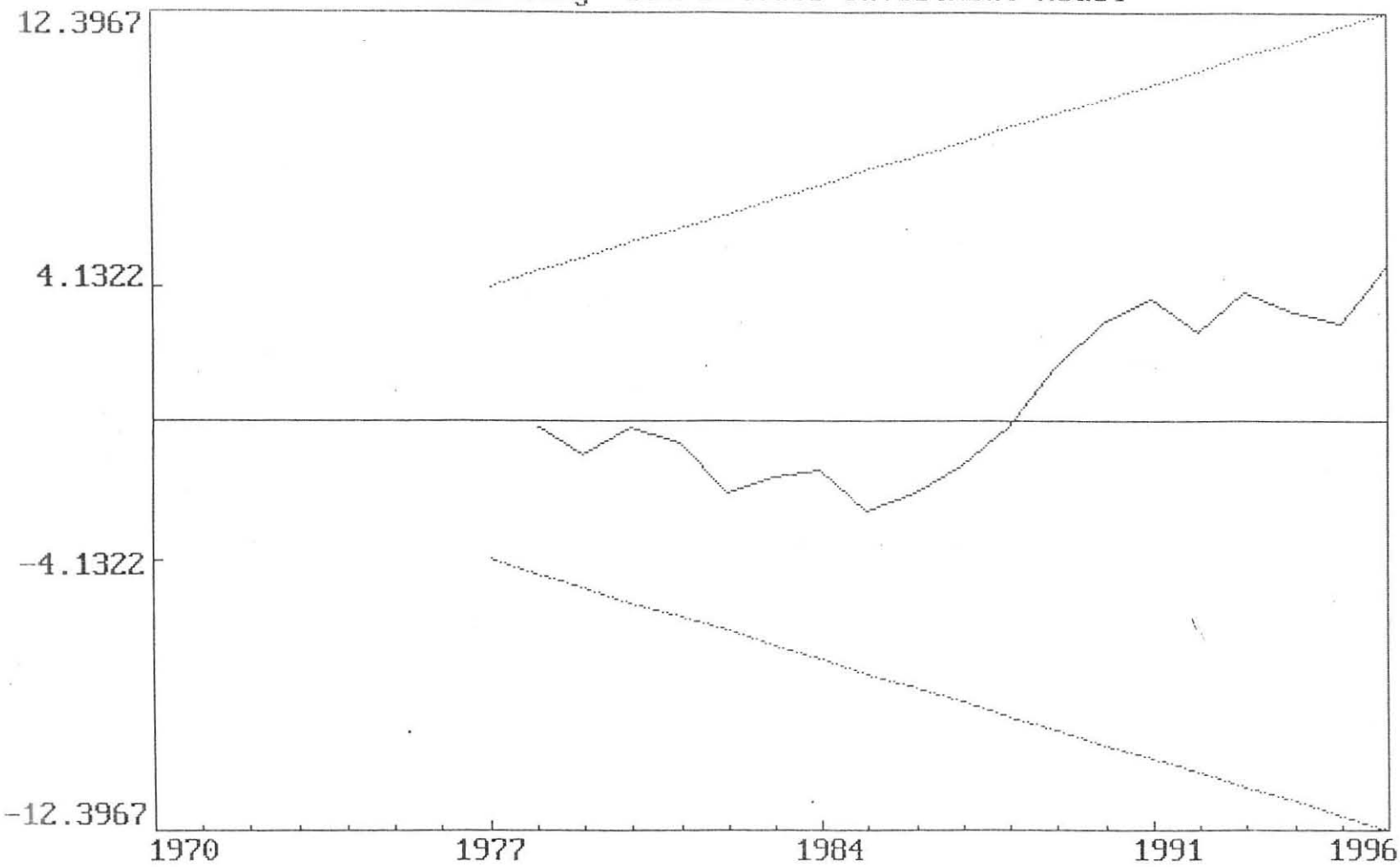
Table A. Diagnostic tests for the long run private investment model

Test Statistics	LM Version		F Version
Serial Correlation	CHI- SQ (1) =	1.2203 [.339]	F(1, 19) 1.1563 [.397]
Functional Form	CHI- SQ (1) =	.02517 [.874]	F(1, 19)= .01773 [.895]
Normality	CHI- SQ (2) =	.88651 [.642]	Not applicable
Heteroscedasticity	CHI- Sq (1) =	1.2786 [.258]	F(1, 25)= 1.2427 [.276]

Table B. Diagnostic tests of the Short run private investment model

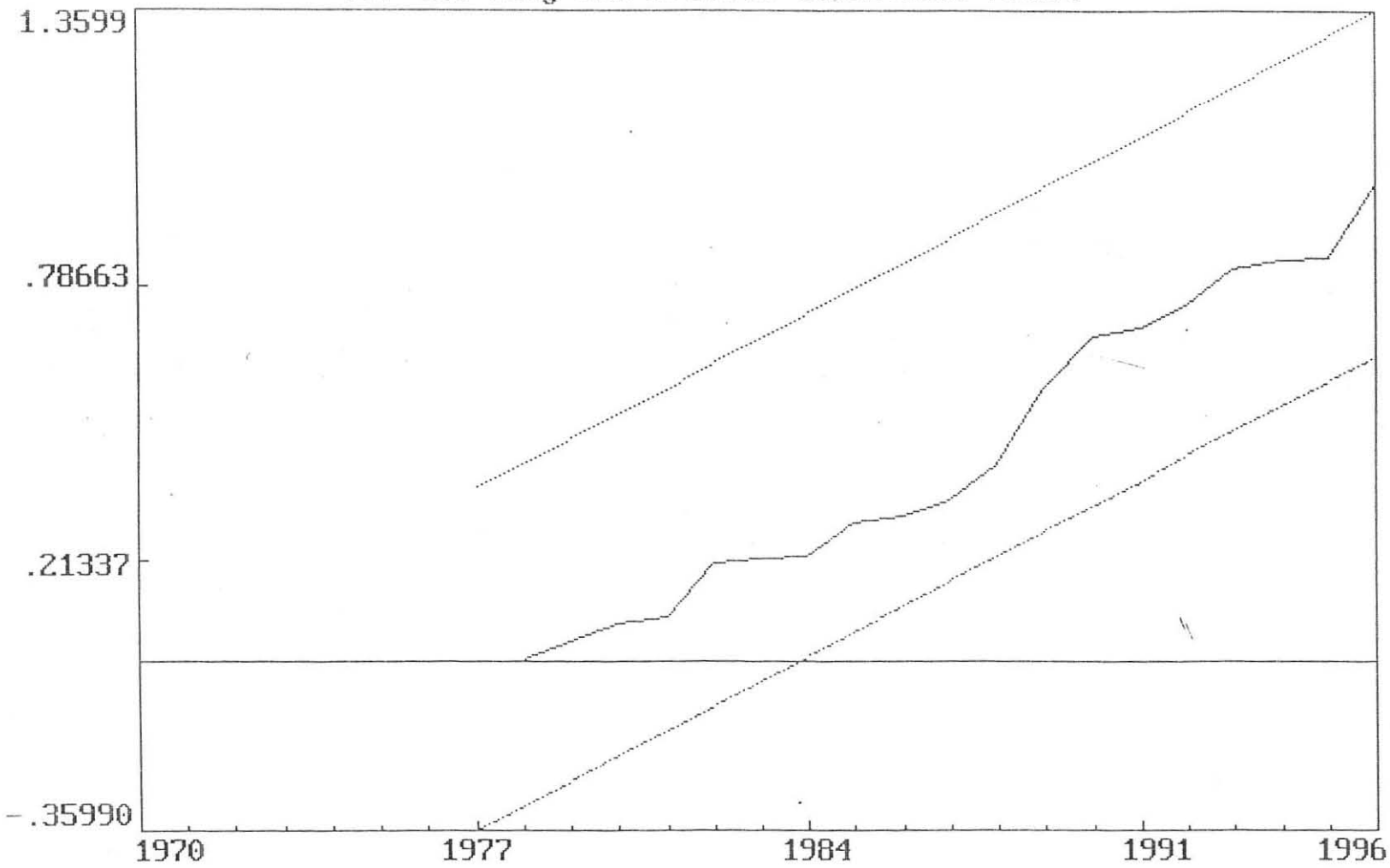
Test Statistics	LM Version		F Version
Serial Correlation	CHI- SQ (1) =	.43848 [.508]	F(1, 15) .26779 [.612]
Functional Form	CHI- SQ (1) =	.02327 [.879]	F(1, 15) .01398 [.907]
Normality	CHI- SQ (1) =	1.2890 [.525]	Not applicable
Heteroscedasticity	CHI- SQ (1) =	.27502 [.600]	F(1, 23) .25583 [.618]

Figure 2(a) Plot of Cumulative Sum of Recursive Residuals
for the Long- run Private Investment Model



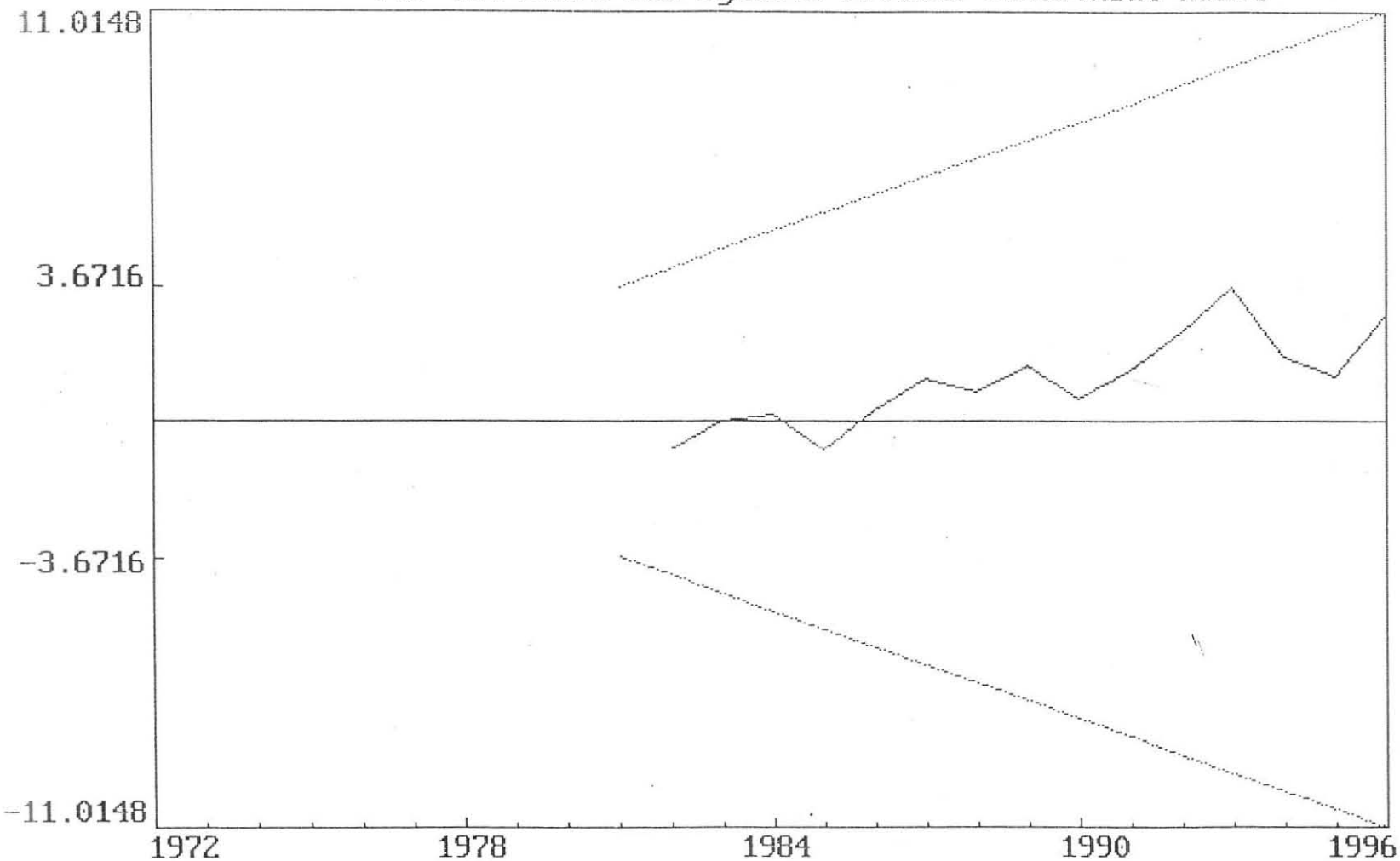
The straight lines represent critical bounds at 5% significance level

Figure 2(b) Plot of Cumulative Sum of Squares of Recursive Residuals
for the Long Run Private Investment Model



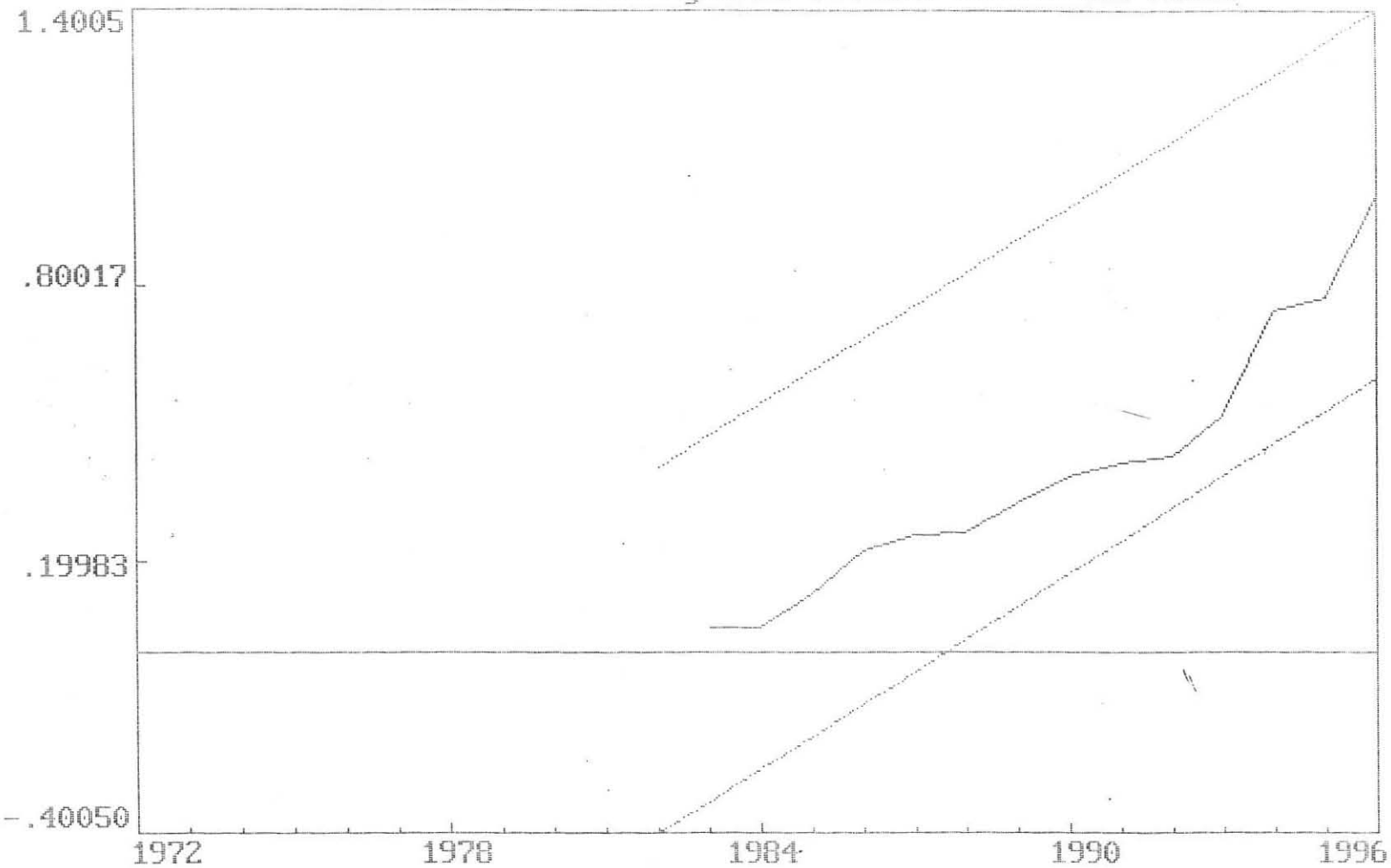
The straight lines represent critical bounds at 5% significance level

Figure 3(a) Plot of Cumulative Sum of Recursive Residuals
for the Short run Dynamic Private Investment Model



The straight lines represent critical bounds at 5% significance level

Figure 3(b) Plot of Cumulative Sum of Squares of Recursive Residuals for the Short run Dynamic Private Investment Model

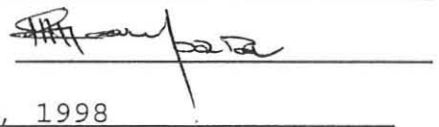


The straight lines represent critical bounds at 5% significance level

DECLARATION

I, the undersigned, declare that this thesis is my own original and has not been presented in any University. All sources of materials for this thesis have been fully acknowledged.

Name: GERSON Ellis HARUPARA

Signature: 

Date: June, 1998

Place: Addis ababa