An investigation into the nature and impact of financial repression in Trinidad and Tobago: 1960-1991

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By

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A Doctoral Thesis
Submitted in partial fulfilment
of the requirements for the award of
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Department of Economics
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ABSTRACT

This research examines the nature and impact of financial repression in the Trinidad and Tobago economy using cointegration time series techniques and disequilibrium econometrics. While the former is employed to estimate the impact on savings, investment and growth, the latter is mainly used to test whether the characteristics which depict a financially repressed economy are present in Trinidad and Tobago. Trinidad and Tobago has not previously been the subject of such a study, and neither estimation methods have been used to investigate financial repression.

While the real interest has been most frequently used to measure financial repression, six proxies are utilised in this study: the real interest rate; dummy variables; commercial banks' reserve requirement; inflation; the difference between the domestic and the foreign interest rate and a variable to measure the overvaluation of a country's currency. With respect to the latter there are two definitions: the difference between the official and the blackmarket exchange rate and the degree of exchange rate misalignment.

The results using real interest rates and inflation measures of financial repression suggest that while liberalisation cannot be seen as the solution to increasing savings and investment it may promote economic growth. When all the other proxies are examined the impact of financial repression on the economy is negative albeit statistically insignificant in most instances. There is some indication that exchange rate should be devalued so as to reduce exchange rate misalignment and reduce the widening gap between the official and blackmarket rate. On the basis of these results the McKinnon-Shaw hypothesis cannot be rejected. However the results when inflation and real interest rates are the relevant proxies for financial repression as well as the low significance levels of other proxies, ought to serve as warning signals to avoid implementing drastic liberalisation measures too quickly.
TABLE OF CONTENTS

Abstract ii
Acknowledgements iii
List of Tables viii
List of Figures x
Key of Abbreviations of Variables xi

Chapter One  Introduction 1
  1.1 Background 1
  1.2 Aims and Contributions 3
  1.3 Some Characteristics of the Trinidad and Tobago Economy 6
  1.4 Structure of the Thesis 8

Chapter Two  Financial Repression: Theoretical and Conceptual Issues 10
  2.1 Introduction 10
  2.2 Some insights into the Theory of Financial Repression 10
  2.3 Traditional Arguments for Low Interest Rates 15
  2.4 A Critique of the Financial Repression Theory 16
  2.5 Transmission Mechanisms 22
  2.6 An Extension of the Financial Repression Theory 26
    2.6.1 Asset Market 29
    2.6.2 Balance of Trade 30
    2.6.3 Currency Substitution, Capital Flight and Inflation Hedges 31
  2.7 Conclusion 33

Chapter Three  Financial Repression: A Review of the Empirical Literature 34
  3.1 Introduction 34
  3.2 Saving Models 34
    3.2.1 The Dependent variable 34
    3.2.2 The Financial Repression Variable 36
    3.2.3 Empirical Evidence on other Explanatory Variables 42
Chapter Six  Investment, Financial Repression and Financial Liberalisation

6.1 Introduction 110
6.2 Factors Affecting Private Investment 111
  6.2.1 Government Investment 112
  6.2.2 Credit to the Private sector 114
  6.2.3 Foreign Savings 115
  6.2.4 External Debt 116
  6.2.5 Stability and Adjustment 117
6.3 Empirical Results and Implications for Policy 119
  6.3.1 Proxy One: The Real Interest Rate 120
  6.3.2 Proxy Two: Dummy Variable 122
  6.3.3 Proxy Three: The Commercial Banks’ Reserve Requirement 123
  6.3.4 Proxy Four: The Rate of Inflation 124
  6.3.5 Proxy Five: The Foreign-Domestic Interest Rate Differential 125
  6.3.6 Proxy Six: The Official black-market Exchange Rate Difference 126
6.4 Conclusion 129

Chapter Seven  Financial Repression and the Rate of Economic Growth

7.1 Introduction 134
7.2 The Growth Model 136
7.3 Explanatory Variables 138
  7.3.1 Financial Repression Proxies 138
  7.3.2 Dependency Ratio 139
  7.3.3 Engine of Growth 141
  7.3.4 External Debt 143
  7.3.5 Other Variables 144
7.4 Empirical Results and Implications for Policy 146
  7.4.1 Proxy One: The Real Interest Rate 147
  7.4.2 Proxy Two: Dummy Variable 147
  7.4.3 Proxy Three: The Commercial Banks’ Reserve Requirement 148
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.4.4 Proxy Four: The Rate of Inflation</td>
<td>149</td>
</tr>
<tr>
<td>7.4.5 Proxy Five: The Foreign-Domestic</td>
<td>150</td>
</tr>
<tr>
<td>7.4.6 Proxy Six: The Official black-market Exchange Rate Difference</td>
<td>150</td>
</tr>
<tr>
<td>7.6 Conclusion</td>
<td>155</td>
</tr>
<tr>
<td><strong>Chapter Eight</strong> A Disequilibrium Econometric Model of Savings and Investment</td>
<td></td>
</tr>
<tr>
<td>8.1 Introduction</td>
<td>159</td>
</tr>
<tr>
<td>8.2 The General Model</td>
<td>160</td>
</tr>
<tr>
<td>8.2.1 The Directional Methods</td>
<td>163</td>
</tr>
<tr>
<td>8.2.2 The Quantitative Method</td>
<td>165</td>
</tr>
<tr>
<td>8.3 A Saving and Investment models based on the Quantitative Method</td>
<td>168</td>
</tr>
<tr>
<td>8.4 Empirical Results and Implications for Policy</td>
<td>173</td>
</tr>
<tr>
<td>8.4.1 Equilibrium Model</td>
<td>174</td>
</tr>
<tr>
<td>8.4.2 Directional Model</td>
<td>176</td>
</tr>
<tr>
<td>8.4.3 Quantitative Model</td>
<td>178</td>
</tr>
<tr>
<td>8.5.4 A Disequilibrium Model Relevant to a Financially Repressed Economy</td>
<td>183</td>
</tr>
<tr>
<td>8.6 Conclusion</td>
<td>185</td>
</tr>
<tr>
<td><strong>Chapter Nine</strong> Conclusion</td>
<td>187</td>
</tr>
<tr>
<td><strong>Selected Bibliography</strong></td>
<td>191</td>
</tr>
<tr>
<td>Table No.</td>
<td>Title</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Table 4.1</td>
<td>Real rates of interest for the period 1960-1991</td>
</tr>
<tr>
<td>Table 4.2</td>
<td>Phillips-Perron unit root test</td>
</tr>
<tr>
<td>Table 4.3</td>
<td>Phillips-Perron unit root test</td>
</tr>
<tr>
<td>Table 4.4</td>
<td>Phillips-Perron unit root test</td>
</tr>
<tr>
<td>Table 4.5</td>
<td>Phillips-Perron unit root test</td>
</tr>
<tr>
<td>Table 4.6</td>
<td>Phillips-Perron unit root test</td>
</tr>
<tr>
<td>Table 5.1</td>
<td>A guide to abbreviations for diagnostics</td>
</tr>
<tr>
<td>Table 5.2</td>
<td>Summary table of financial repression Proxies for the aggregate savings model</td>
</tr>
<tr>
<td>Table 5.3</td>
<td>Summary table of coefficient signs Long run aggregate savings models</td>
</tr>
<tr>
<td>Table 5.4</td>
<td>Summary table of coefficient signs Short run aggregate savings models</td>
</tr>
<tr>
<td>Table 5.5</td>
<td>Summary table of coefficient signs Long run private savings models</td>
</tr>
<tr>
<td>Table 5.6</td>
<td>Summary table of coefficient signs Short run private savings models</td>
</tr>
<tr>
<td>Table 6.1</td>
<td>Summary table of financial repression Proxies for private and aggregate investment models</td>
</tr>
<tr>
<td>Table 6.2</td>
<td>Summary table of coefficient signs Long run private investment models</td>
</tr>
<tr>
<td>Table 6.3</td>
<td>Summary table of coefficient signs Short run private investment models</td>
</tr>
<tr>
<td>Table 6.4</td>
<td>Summary table of coefficient signs Long run aggregate investment models</td>
</tr>
<tr>
<td>Table 6.5</td>
<td>Summary table of coefficient signs Short run aggregate investment models</td>
</tr>
<tr>
<td>Table 7.1</td>
<td>Summary table of financial repression Proxies for the growth model</td>
</tr>
<tr>
<td>Table 7.2</td>
<td>Summary table of coefficient signs Long run growth models</td>
</tr>
<tr>
<td>Table 7.3</td>
<td>Summary table of coefficient signs Short run growth models</td>
</tr>
<tr>
<td>Table 8.1</td>
<td>Estimates of the saving rate equation in an equilibrium model</td>
</tr>
<tr>
<td>Table 8.2</td>
<td>Estimates of the saving rate equation in an equilibrium model</td>
</tr>
<tr>
<td>Table 8.3</td>
<td>Estimates of the saving rate equation in directional model one</td>
</tr>
<tr>
<td>Table 8.4</td>
<td>Estimates of the investment rate equation in directional model one</td>
</tr>
<tr>
<td>Table 8.5</td>
<td>Estimates of the savings rate equation in the quantitative model using single equation estimation</td>
</tr>
<tr>
<td>Table 8.6</td>
<td>Estimates of the investment rate equation in the quantitative model using single equation estimation</td>
</tr>
<tr>
<td>Table 8.7</td>
<td>Estimates of the savings rate equation in the quantitative model using two stage least squares estimation</td>
</tr>
<tr>
<td>Table 8.8</td>
<td>Estimates of the investment rate equation in the quantitative model using two stage least squares estimation</td>
</tr>
<tr>
<td>Table 8.9</td>
<td>Estimates of the savings and investment rate equation using the SUR model</td>
</tr>
<tr>
<td>Table 8.10</td>
<td>Estimates of the savings rate equation in the financially repressed economy using single stage estimation</td>
</tr>
<tr>
<td>Table 8.11</td>
<td>Estimates of the investment rate equation in the financially repressed economy using single stage estimation</td>
</tr>
<tr>
<td>Table 8.12</td>
<td>Estimates of the savings rate equation in the financially repressed economy using two stage estimation</td>
</tr>
<tr>
<td>Table 8.13</td>
<td>Estimates of the investment rate equation in the financially repressed economy using two stage estimation</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>An illustration of savings and investment under financial repression</td>
<td>11</td>
</tr>
<tr>
<td>2.2</td>
<td>Financial repression in the foreign exchange market</td>
<td>27</td>
</tr>
<tr>
<td>3.1</td>
<td>The effect of high interest rates on investment</td>
<td>48</td>
</tr>
<tr>
<td>4.1</td>
<td>The responsiveness of savings to different degrees of financial repression</td>
<td>63</td>
</tr>
<tr>
<td>8.1</td>
<td>An illustration of the quantitative method</td>
<td>163</td>
</tr>
<tr>
<td>8.2</td>
<td>An illustration of different degrees of excess demand</td>
<td>169</td>
</tr>
</tbody>
</table>
## KEY OF ABBREVIATIONS OF VARIABLES

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMR</td>
<td>Blackmarket Rate</td>
</tr>
<tr>
<td>CP</td>
<td>Real Credit to the Private Sector</td>
</tr>
<tr>
<td>CR</td>
<td>Real Commercial Bank Reserves</td>
</tr>
<tr>
<td>DCs</td>
<td>Developed Countries</td>
</tr>
<tr>
<td>DR</td>
<td>Dependency Ratio</td>
</tr>
<tr>
<td>FD</td>
<td>Foreign Domestic Interest Rate Differential</td>
</tr>
<tr>
<td>FINF</td>
<td>Foreign Inflation</td>
</tr>
<tr>
<td>FS</td>
<td>Real Foreign Savings</td>
</tr>
<tr>
<td>FSY</td>
<td>Foreign Savings Income Ratio</td>
</tr>
<tr>
<td>GD</td>
<td>Real Government Debt</td>
</tr>
<tr>
<td>GSY</td>
<td>Government Savings to Income Ratio</td>
</tr>
<tr>
<td>I/Y</td>
<td>Investment Income Ratio</td>
</tr>
<tr>
<td>INF</td>
<td>Domestic Inflation</td>
</tr>
<tr>
<td>IP/Y</td>
<td>Private Investment Income Ratio</td>
</tr>
<tr>
<td>LDCs</td>
<td>Less Developed Countries</td>
</tr>
<tr>
<td>R</td>
<td>Real Interest Rate</td>
</tr>
<tr>
<td>RER</td>
<td>Real Exchange Rate</td>
</tr>
<tr>
<td>RMON</td>
<td>Real Money</td>
</tr>
<tr>
<td>RY</td>
<td>Real Income</td>
</tr>
<tr>
<td>S/Y</td>
<td>Savings Income Ratio</td>
</tr>
<tr>
<td>TT$</td>
<td>Trinidad and Tobago Dollars</td>
</tr>
<tr>
<td>US$</td>
<td>United States Dollars</td>
</tr>
<tr>
<td>XCR</td>
<td>Exchange Rate</td>
</tr>
<tr>
<td>XD</td>
<td>Blackmarket-Official Exchange Rate Difference</td>
</tr>
<tr>
<td>XM</td>
<td>Exchange Rate Misalignment</td>
</tr>
<tr>
<td>YG</td>
<td>Real Economic Growth</td>
</tr>
<tr>
<td>YP</td>
<td>Real Per Capita Income</td>
</tr>
</tbody>
</table>
CHAPTER ONE

Introduction

1.1 Background
The concept of financial repression stems from the seminal works of McKinnon (1973) and Shaw (1973). In general it refers to a situation in which prices are distorted as a result of disturbances which inhibit the operation of the price mechanism. More specifically it is a situation in which interest rates are maintained at levels below market equilibrium. Interest rates may be relatively inflexible in developing countries. They are prevented from performing their allocative role in the saving and investment process because financial markets are relatively thin as a consequence of low income and the limited degree of monetisation. These financial markets are frequently dominated by a few banks which are often able to exercise monopolistic or oligopolistic control. As a result ceilings are often imposed on interest rates in developing countries in an attempt to remedy this situation.

Formal analysis of interest rate policy goes back to the Classical and Neo-classical theories of economic growth and the Keynesian theory of unemployment. The classical-neoclassical school considered the paucity of savings to be the basic obstacle to growth. This idea is founded in the loanable funds theory whereby the equilibrium interest rate is determined by the interaction of supply and demand for loanable funds. People save more at high interest rates than at low rates if they wish to maximise their intertemporal utility. An individual is assumed to have some preference function which relates the satisfaction from using his income for current consumption to the satisfaction he will get by deferring his consumption to some future period.

Neoclassical theory sees the development process as led by savings with investment following, rather than the other way round. This underlies the belief that tight money and high interest rates are desirable for investment. Typifying the classical position are Chandler's Bombay Lectures (Chandler 1962). In these lectures he argues that interest rates are too low in LDCs hence they discourage savings and encourage the wasteful use of capital. It is conceded that low interest rates encourage investment, but Chandler argues that it is not the lack of willingness to invest that constrains investment but the lack of saving.

These ideas are captured in the savings gap type of analysis. It's proponents contend that in LDCs there is widespread potential for investment projects which it is
impossible to undertake because of a shortage of investible funds. In other words there is a shortage of savings. When planned investment exceeds planned savings, a savings gap emerges and foreign resources are sought to eliminate the gap.

In the Neoclassical analysis an increase in savings has to brought about via a fall in consumption at the start of the investment process. Investment can only run ahead of savings if it has been financed by credit creation. However this may create inflationary pressures because of the assumption that the aggregate supply curve of output tends to become vertical almost immediately after any initial rise in investment.

This approach has been criticised because it treats savings and investment as interdependent and not independent. Furthermore, it assumes that output is relatively inelastic in LDCs because of limited capital equipment. It has been argued, however, that even in LDCs the range within which factor proportions can be shuffled is wide and hence the investor can reduce the use of capital input relative to labour and still raise output (Sicat, 1963; Kennedy, 1971). Lastly, because of the substitution and income effects there is no assurance that a higher interest rate will lead to a higher personal saving ratio. If the income effect is larger then a fall in savings will follow a rise in the interest rate.

Keynesian theory, on the other hand, advocates a low interest rate policy since investment is perceived as the limiting factor in economic development. While it welcomes prior savings, what it disputes is that saving must preface investment and that the latter is constrained by the former. On this view it is possible to reduce the marginal propensity to consume once investment is allowed to generate income. The root of this type of analysis lies in the liquidity preference theory. If the lack of finance is the bottleneck in the investment-biased framework, the monetary authorites will simply reduce interest rates and with it the associated increase in the quantity of money.

Keynesians argue for low interest rates and monetary expansion on the hypothesis that credit-financed investment can generate its own savings through a number of mechanisms. For example, when a credit finance investment is made in conditions of full employment, money wages and profit increase. Since the propensity of profit earners to save is higher than that of wage earners there is an overall increase in the savings ratio which would catch up with the initial increase in investment (Khatkhate, 1970). Thus, in Keynesian theory any inflationary pressure is perceived of as transient, since it is swamped by a subsequent increase in savings.
Nevertheless the Keynesian approach to interest rate policy has been criticised on account of high and sometime destabilising price expectations as lower interest rates would only be appropriate up to that point where dormant savings are absorbed into new investment. Beyond this it may have a perverse effect on interest rates in the long run, when any increase in the money supply would have filtered through the economy and enough time has elapsed so that inflationary pressures are created. Additionally in these economies it is difficult to reduce the marginal propensity to consume in the agriculture sector (which in many instances represents the largest sector) because of difficulties in applying restrictive measures and the growing population.

Both Classical and Keynesian theories were condemned by McKinnon (1973) and Shaw (1973). Although their policy implication were similar to the Neoclassical theory it was criticised on the grounds that it proposes a competitive rather than complementary relationship between money balances and capital accumulation. McKinnon (1973) expressed the view that investors must accumulate money balances prior to investment. This is based on the assumption that economic units are confined to self-finance. Similarly the Keynesian theory of the interest rate was criticised as being short-term and not relevant to developing countries for the reasons explained above.

1.2 Aims and Contribution
The belief of the "repressionists" is that, economic growth suffers in an economy which is characterised by financial repression. This, therefore is the basic hypothesis to be tested in this thesis. Additionally, the limitation of concentrating solely on the relationship between saving and financial repression as the early theorists and empiricists did, is abandoned. Thus the aim of this research is to test the hypothesis of financial repression on savings, investment and growth in the Trinidad and Tobago economy.

Financial repression is inherently linked to other concepts, for example, financial deepening, financial intermediation, financial deregulation and financial liberalisation. An absence of financial deepening is one of the characteristics of financial repression (Galbis, 1982). That is, the real size of the financial sector is unable to expand as the volume of financial sector liabilities to the private sector in relation to GDP shrinks. The financial intermediation process cannot be efficient and hence is unable to achieve its full potential. If financial repression is found to exert a
negative influence on savings, investment and growth, the policy prescription as far as the "repressions" are concerned is one of liberalisation. That is, constraints on prices should be relaxed so as to enhance the operation of the price mechanism. Thus, a test for the influence of financial repression can also be interpreted as a test to indicate whether or not liberalisation policies should be implemented. While it gives an idea about the advantages or disadvantages of deregulation, it provides no indication of the intensity of measures or time period over which the measures are to be implemented.

This thesis makes a contribution to both the theoretical and empirical literature on financial repression. A sector is defined as "repressed" if there is a distortion in prices. There is a tendency for financial repression to be confined to the monetary sector. Although, based on this general definition there is no reason why financial repression should be restricted to any one sector. In this research an attempt is made to overcome this limitation by broadening the interpretation of financial repression to apply to sectors other than the monetary sector. In particular, the exchange rate is used as an indicator and measure of financial repression. In developing countries, the exchange rate is often fixed by authorities and can be maintained at an overvalued level for a considerable period. Hence repression of the exchange rate can be treated in a manner similar to repression of the interest rate. Therefore six different proxies are employed in an attempt to estimate the impact of financial repression on the economy.

A second contribution of this thesis is that it is the first systematic empirical study of financial repression in the Caribbean. There is a tendency for researchers to test the impact of financial repression on Asian, African and Latin American economies. More often, the individual Caribbean economies are lumped together with the Latin American countries and never considered on their own. This research should provide a stimulus for empirical research into other Caribbean economies, which subsequently may encourage comparative analysis within the Caribbean and with other developing countries.

This thesis also makes a methodological contribution to the empirical literature of financial repression. It is the first to apply cointegration time series econometrics and disequilibrium econometric methods to the phenomenon of financial repression. A financially repressed economy is, by definition, characterised by excess demand for investible resources and no excess supply of savings. Disequilibrium econometrics provides an opportunity to test the validity of this hypothesis. Excess demand and excess supply conditions are built into the models based on disequilibrium
econometrics and it is possible therefore to deduce whether excess demand or excess supply exist in the market. If, for example, neither the proxies for excess supply or excess demand are found to be significant, the economy cannot be financially repressed, since by definition a market which is financially repressed must be one in disequilibrium. Generally, our results indicate that the Trinidad and Tobago economy is financially repressed with significant excess demand proxies and insignificant excess supply proxies. Researchers rarely test the validity of this assumption. Rather the situation is assessed by examining only the nature of the real rate of interest. If it is found to be negative for a long period, it is usually concluded that financial repression exists and suggested that there must be an excess demand for loanable funds. This research therefore extends this traditional approach and empirically investigates the characteristic of a financially repressed economy in terms of the excess demand for investible funds or the excess supply of loanable funds the economy.

The cointegration methodology based on the Engle-Granger procedure is also employed to test the importance of financial repression. Although it is not new, there appears to be limited research involving this type of econometric technique to developing countries. One of the empirical problems of studying developing countries is the lack of a long run of data. Often when available, the data are inaccurate and incomplete. While quarterly data is virtually impossible to obtain very little can be done to extend the data set. Using annual data for the period 1960-1991 the empirical results obtained in this study infer that while financial repression, measured by the interest rate and inflation, does not have a negative influence on savings and investment, its has an adverse impact on economic growth albeit insignificant. However, when financial repression is measured by all other proxies including the exchange rate, its' impact on savings, investment and growth is negative.

Where possible, the cointegration methodology was chosen over standard econometric modelling procedures since it overcomes the basic shortcoming of the latter, by discarding the assumption that the underlying data processes are stationary. Classical statistical inference is valid in models which include only stationary variables. Unfortunately most economic time series are non-stationary and as a result the models are misspecified. Cointegration analysis allows the estimation of a long-run relationship and the specification of an equation in which all terms are stationary, allowing the use of classical statistical inference.
1.3 Some Characteristics of the Trinidad and Tobago Economy

Trinidad and Tobago are the southernmost islands in the Caribbean, approximately twenty-two kilometres off the Venezuelan coast. It was discovered and settled by the Spanish until the early seventeenth century when it was conquered by the English. Thereafter it remained a British colony until 1962 when it became an independent member of the Commonwealth. In 1976 it became a republic state.

Oil is the main income earner of Trinidad and Tobago. The year-to-year growth of the economy is very much dependent on the movement of oil prices. On average oil's contribution to GDP is 25 to 30 percent and 60 to 70 percent of exports. The next major contributor to GDP is the agriculture sector, followed by manufacturing and services. With respect to the contribution of exports manufacturing ranks second and agriculture, third. In the last decade, growth rates of the manufacturing sector have been higher than both the petroleum and agriculture sectors. This is partially because of attempts at diversifying the economy and reducing its dependence on oil, as well as the decline in oil production due to the maturation of producing fields. For almost the entire period under study North America has been the major trading partner of Trinidad and Tobago. On average less than 10 percent of goods are exported to other Caribbean Community (CARICOM) countries, while less than 6 percent are imported from these countries.

Trinidad and Tobago experienced positive real growth until 1982, recording the highest level in 1978 and 1980 of approximately 10 percent. For the period 1972 to 1982 the average annual growth rate in real terms was 5 percent. Subsequent to 1982 the economy contracted until 1990 when it finally grew by 1.7 percent. Per capita income has been the highest in Trinidad and Tobago compared to the other Caribbean islands. Increasing from 639 United States dollars (US$) in 1960 to 2036US$ in 1974, this upward trend continued until 1982 when it was 7161US$. It subsequently declined until 1988 (3356US$). By 1991 it had increased to 4291US$.

Unemployment and inflation rates can be described as high for most of the period under consideration. In only two years from 1963 to 1993 were unemployment rates less than ten percent in 1980 and 1982. Generally however, there was a tendency for unemployment to decline in the seventies and early eighties, rising thereafter to a

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1 All statistical information in this section can be found in the following:
   3. Handbook of Key Economic Statistics

Published by the Central Statistical Office and the Central Bank of Trinidad and Tobago. (See References for additional sources of data)
maximum of 22.3 percent in 1987, after which it started to decline very gradually. Inflation rates were low (less than 6 percent) until 1972. They increased steadily for almost all of the seventies, attaining a rate of 17 percent in 1980, before declining slowly in the eighties. By 1991 inflation fell to 4 percent, the lowest in twenty years.

Trends in aggregate savings and investment ratios are similar to each other. For the period 1970 to 1983 investment rates were on average above 25 percent. Although there were improvements from year to year subsequently, it generally followed a declining trend, to approximately 15.5 percent in 1991. Saving rates prior to 1972 were less than 10 percent. The saving rate increased in the seventies and by 1980 it was 30 percent. From 1981 onwards it fell, with a temporary respite in 1990. (In 1986 the recorded level was -0.4 percent.) However by 1991 it had reverted to a level similar to that experienced in the early sixties (7.6 percent).

Trinidad and Tobago recorded overall deficits in the balance of payments for most of the sixties and early seventies. However, this changed rapidly in 1974 when a surplus of 602.6TTM$ (294USM$) was recorded, increasing from -28.1TTM$ in the previous year. The economy continued to experience surpluses until 1981. By 1983 the deficit has quadrupled from -524.7TTM$ in 1982 to -2162.5TTM$. Although there were subsequent years where it declined, the trade balance remained negative and by 1991 it was -1325.2TTM$.

Debt servicing ratios were generally manageable at least until 1986 when it reached about 73 percent higher than the previous year (11 percent). This increased to 29 percent by 1991. At the end of 1988 Trinidad and Tobago's net foreign reserves stood at-24.3TTM$ compared with net foreign assets of 286.6TTM$ at the end of 1987. In order to alleviate the situation the Trinidad and Tobago dollar, which was devalued in 1985 was again devalued in 1988. Although there was some improvement in 1989 and 1990, there was a deterioration in 1991, when reserves stood at -70.1TTM$ (16.5USM$).

Confronted with escalating economic problems the government of Trinidad and Tobago approached the IMF in 1989. Two stand-by Arrangements were negotiated with the International Monetary Fund in 1989 and 1990 as well as a Structural Adjustment Loan with the World Bank in 1990. The effects of these financial policies, however take us beyond the scope of this study which examines the hypothesis of financial repression for the period 1960 to 1991.
1.4 Structure of the Thesis

This thesis consists of nine chapters. In Chapter Two an examination of the theoretical background of financial repression is undertaken. This includes a discussion of the basic principles of financial repression, an analysis of some models of financial repression, a critique of the theory and an extension of the theory to incorporate the external sector. An analysis of possible links between repressed prices in both the internal and external sector is also discussed.

A review of the empirical research on financial repression is conducted in Chapter Three. Different types of model are examined, as well as the relevant variables in each model and their definitions. The methodology, time frame and the specific economy form a part of this discussion. This chapter is sectionalised depending on whether we are looking at savings, investment or growth models. This is important, since this structure underlies the models to be tested in subsequent chapters.

Chapter Four discusses the measurement of financial repression and the cointegration methodology. The proxies of financial repression are analysed together with the data sources and problems encountered in the process of collecting and assimilating the data. In discussing cointegration concepts such as stationarity, unit root testing, long-run relationships and error correction models are explored. Results of the units root tests for each of the series incorporated in the models are presented in this chapter (Section 4.4).

In Chapters Five, Six and Seven empirical models of savings, investment and growth respectively are estimated using the cointegration methodology and the six proxies of financial repression. For each of these models seven specifications are estimated (proxy six has two definitions). In each of these chapters there is an analysis of the relevant model, a discussion and the definition of each variable that is included as an explanatory variable. An exploration into the background surrounding the general form of the model is also provided. This is followed by the empirical results and the policy implications. Savings and investment are key indicators of any economy’s performance. Policy-makers aim to pursue strategies which improve the mobilisation of savings, enhance investment and ultimately push the economy along a path of positive and higher growth. To achieve this objective, the determinants and weight of the determinants of each of these economic indicators must be explored. In these chapters however, the determinant which is focused on is financial repression. It is to this end that these chapters are directed.
In Chapter Eight models of savings and investment are estimated using the disequilibrium econometric methodology. This chapter is important since it helps to indicate the presence or absence of excess investment demand which characterise the condition of excess demand. Deciding whether or not financial repression exists in the Trinidad and Tobago economy is crucial to this study. Rather than simply examining the interest rate to decide upon its existence, the adaptation of disequilibrium econometrics represents a more scientific approach to this problem. In this chapter disequilibrium through directional and quantitative methods as well as equilibrium models are estimated.

Chapter nine provides a brief summary of the main results and their implications for monetary and financial policy in Trinidad and Tobago. In particular I find that the hypothesis of financial repression cannot be rejected over my sample period.
CHAPTER TWO

Financial Repression:
Theoretical and Conceptual Issues

2.1 Introduction
Financial repression can be defined as a distortion of prices in an economy. It is mainly the result of interventionist policies by the monetary authorities. As a consequence, the operation of the price mechanism is disrupted and the process of economic development is inhibited. Examples of interventionist policies include interest rate ceilings, selective credit controls sometimes accompanied by subsidised interest rates and restrictions on the reserve requirement ratio. A distortion of prices in the McKinnon-Shaw analysis refer mainly to the interest rate but as will be shown later, it can be extended to an analysis which incorporates the exchange rate.

The theory of financial repression provides a theoretical foundation for the role of finance in the growth of developing countries and is said to be especially relevant to less developed countries. However Galbis (1982) cautions that "it can neither be applied indiscriminately to all less developed countries nor is it necessarily irrelevant to the more advanced ones." In the discussion that follows the core elements of the financial repression paradigm are presented, followed by a critique of the theory and a discussion of some traditional arguments for low interest rates. Additional issues to be addressed include the individual transmission mechanisms of McKinnon and Shaw and an extension of the financial repression theory to the external sector.

2.2 Some Insights into the Theory of Financial Repression
Fry (1978, 1989) made an attempt to consolidate the core elements of the McKinnon-Shaw (1973) which is illustrated in Figure 2.1. Real interest rate is measured on the vertical axis while saving and investment are represented on the horizontal axis. $F$ represents an administratively determined ceiling on the deposit interest rate imposed by the government. This is below the equilibrium rate. Saving at any income level is a positive function of the real rate of interest. $S_0$ is the level of saving at income level $Y_0$. $I$ represents investment undertaken at various level of real interest rates. At the fixed interest rate $r_0$, actual investment is limited to $I_0$ the amount of saving forthcoming and there is an excess demand for investible funds equivalent to $I_0I_3$. 
If the ceiling is only applicable to savers' interest rate then the interest rate faced by the borrower would be \( r_s \). The spread \( r_s - r_o \) (indicated by the entire shaded area - dotted and dark area) is the windfall profits that can be earned by financial institutions. In this scenario banks and other lending institutions are the principal beneficiaries. However ceilings are also imposed on loan rates. As a result prices do not equate demand and supply. Instead the ceilings have created an excess demand. To the extent that banks observe ceilings, non-price administrative rationing of funds must occur. Collateral, political pressure, loan size and benefits to loan officers are the main factors determining the loan recipients. Lending institutions are vulnerable to influential groups and political abuse.

These non-economic criteria tend to discriminate inefficiently between investment opportunities. Because of the low loan rates and the shortage of saving, financial institutions will exhibit some predilection for traditional low yielding investment projects since these appear the safest and the simplest to finance. Risk premia cannot be charged when ceilings are effective and risky undertaking by the financial institutions are discouraged. That is, there is little incentive for new and less certain investment activities. A large proportion of potentially high yielding projects may be
rationed out as this process discriminates poorly among investment opportunities. In this type of financially repressed economy the investments that are financed yield returns that are barely above the ceiling interest rate, while the higher yielding projects are forgone.

At low rates of return (below the market determined rate) in a financially repressed economy the present value of return will be higher for each project, thus rendering profitable some projects that would have been unprofitable at a higher rate of interest. At higher rates of interest these projects would not have been undertaken. Financial repression in the form of administratively determined interest rates has an adverse impact on both the quality and quantity of investment undertaken.

The real interest rate performs several important functions. One of these is to influence how the income earner allocates his income between present and future consumption. Because there is little or no incentive for profitable saving in a financially repressed economy a bias in favour of current consumption against future consumption is created. Potential depositors, rather than deposit money in the financial institutions and receive low or negative returns, may engage in low yielding investment projects. As a result investors with potentially high yielding projects will not be able to obtain essential external finance. While investors who obtain funds from the financial institutions choose capital intensive projects which frequently require large amounts of imported working capital. In such an economic environment savers are penalised for postponing current consumption while borrowers are provided with free loanable funds or paid to take them away (Shaw, 1973: pp 83).

A parallel market grows as an escape route from repression in the organised sector, where savers and borrowers meet and engage in transactions which are illegal. Their contracts are short term and the rates of interest are high reflecting the shortage of savings, high rates of return to investment, risk of default and the cost of search and bargain for loan renewals.

Lanyi and Saracoglu (1983) suggest several reasons as to why low real rates of interest lowers the productivity of investment. Low interest rates promote credit rationing and quite likely selective credit control. However, its success depends on the ability of policy makers to correctly identify priority sectors and to control the use of funds allocated to such sectors. Several problems makes this a difficult task, it may not be easy to identify priority sectors because of the lack of information. Because of pressures placed upon policy-makers the decisions may be prejudicial. Various groups demand to be classified as the priority sector because of their
"position" in the country. Furthermore there is a strong tendency to include the
government itself and all public sector activities in the priority category even when
there may be no economic justification for doing so. Additional problems arise after
the priority sector is chosen. The choice of a priority sector implies the indiscriminate
support of all projects within this sector, even those with low rates of return, at the
expense of non priority projects with greater benefits for the economy as a whole.

A low interest rate policy may reduce the need for careful product evaluation and the
economic use of resources in the implementation of these products. This is especially
ture for the priority sector. Credit allocation may also be biased if left entirely under
the control of the banking system. There is a privilege in their portfolio for borrowers
who have a long record of stability. That is, well established firms with close
connections would tend to be favoured over smaller or newer borrowers without
regard to the rates of return on respective projects because of personal connections or
risk aversion by the banks.

Low interest rates induce businesses to carry large inventories of raw materials,
intermediate goods and finished products. The transfer of resources out of the
financial sector into inflation hedges aggravate the scarcity of funds for productive
investment and adds to inflationary pressures. Furthermore, it frequently turns out
being wasteful with foreign exchange, encouraging imports of capital or stimulating
exports that depend on imported inputs (Galbis, 1982).

Low real rates of interest may not necessarily achieve a redistribution of income from
the higher to lower income groups (Gonsalves-Vega, 1982), a ground on which it has
always been defended. They do not necessarily stimulate local, small-scale
enterprises and increase employment by expanding the labour intensive activities,
rather, there is a tendency for the exact opposite to ensue. There is a tendency for
large landholders or plantations to receive the bulk of preferential agricultural credits.
Smaller farmers who should be beneficiaries must often depend on money lenders
whose rates are higher. Sub-equilibrium interest rate may separate borrowers into
three classes: non-rationed borrowers who receive the amount of credit requested are
usually large and well-connected; rationed borrowers, recipients of smaller size loans
than requested; and excluded borrowers, usually small producers who wish to borrow
but are not accepted by the banks (Gonsalves-Vega, 1982). Low interest rate thus
lead to a greater concentration of income. Low income households and producers
have little opportunity to invest their savings other than as savings deposits in local
banks. While those in higher income groups have a wider choice of assets because
they are wealthy and political and financial connections.
Declining real interest rates produce a fall in the demand for domestic financial assets, which in turn has implications for the balance of payments position of the economy. Even if there is not total freedom of capital movements there is an increase in the demand for foreign assets which can be obtained illegally. Capital outflows may be large if the foreign interest rate is high or if the exchange rate is overvalued. The authorities may then be coerced to draw down on their international reserves and introduce restrictions on capital movements and impose conditions of obtaining foreign exchange.

As the degree of financial constraint is relaxed and the interest rate is increased from $r_0$ to $r_1$, low yielding investment projects (the dark shaded block) that were financed before are rationed out. The efficiency of aggregate investment increases. Income rises and shifts the saving function to $S_{r_1}$. Saving increases and hence investment. As the interest rate gets closer to its equilibrium level $r_2$, income grows and investment level of $I_2$ is attained.

It has been sometimes argued that positive real interest rates encourages a larger fiscal deficit and hence inflationary pressures. However protagonists of a high interest rate policy argue that this would only ensue if monetary expansion exceeds the rate at which the demand for financial assets is increasing. This may not necessarily be valid since the deflationary impact, exerted as a result of the increased demand for financial assets following the rise in interest rate and the subsequent reduction in the velocity of circulation, may be larger than the inflationary effect of increasing government expenditures. Furthermore increasing finance costs may induce the government to rationalise operations as well as encouraging portfolio allocation away from inflation hedges into financial assets. This in turn could provide the government with an additional source of revenue without many collection problems.

The introduction of positive real interest rates can reduce capital outflows which provides essential finance to development efforts. On the current account individuals are likely to lower idle inventories of imported raw material and semi-finished products. Nationals working abroad may also be encouraged to maintain a larger inflow of remittances. The result is a once-for-all improvement in the current account. Viewed from a development model perspective financial repression is detrimental to saving, investment and hence economic growth. The real rate of interest is the key to higher investment levels and economic growth and it is a rationing device to greater efficiency.
One may argue that despite increases in the interest rate, investment may not take place if the appropriate infrastructural development is absent or lacking. For other developing countries this might be a problem, but the economy of Trinidad is fairly developed from this perspective. Unlike other developing countries in the Caribbean Trinidad and Tobago benefited from the oil boom in the seventies and early eighties. Revenues earned from this was utilised to enhance the transport and power systems. There is a small but developing petrochemical and manufacturing sector. Its per capita income is the highest in the Caribbean, averaging around 3812 US$. Furthermore Trinidad is ideally situated for trade with the Latin and South American countries, fostering south-to-south trade. Needless to say projects of all types might not be able to be undertaken, but certainly the economy is not so underdeveloped so as to hinder any possible investment.

2.3 Traditional Arguments for Low Interest Rates
If financial repression results in a stunting and retardation of economic growth, why is it allowed to persist? The principal cause as identified by McKinnon and Shaw is the application of erroneous monetary, credit and interest rate policies. Why then do these countries apply policies that result in financial repression? One justification stems from traditional attitudes embedded in usury laws, whereby interest payments are limited on moral grounds. Another justification is to regulate a potential monopoly of the banking system. Financial systems in developing countries tend to be oligopolistic by nature. Without the intervention of the government, collusion of banks would take place which in turn would fix their own interest rate and operate as a monopolist.

The Keynesian paradigm that low interest rates stimulate investment has also been a justification. This however assumes that additional resources will be forthcoming at lower rates. In developing countries this may be especially difficult to achieve because of bottlenecks in the supply of certain factors of production that are essential complements to increased investments. According to Gonsalves-Vega (1983), although it may be more appropriate for developed countries with a saturation of investment opportunities it is not applicable to developing countries. This is because developing countries are characterised by the availability of investment opportunities which cannot be taken advantage of because of the insufficiency of investible resources (not by excess savings and a shortage of investment opportunities an in DCs).
Another argument lies in the redistribution of income and reallocation of resources. High interest rates are considered as inflation propelling through a cost-push mechanism, hence to avoid this type of inflation, ceilings on interest rate should be imposed. It is also claimed that low interest rate strengthens the stability of financial institutions because it protects banks' earnings. Ceilings may also be imposed on the government's part in an attempt to keep down the cost of servicing the public sector debt. It has also been argued that low interest rates can be used to counter balance the adverse effect of the unorganised money market - to assist in preventing exploitation of individuals by the latter.

2.4 A Critique of the Financial Repression Theory

The financial repression paradigm is not without criticism. The natural policy recommendation according to this theory is an increase in the level of real interest rates. However Taylor (1983) and Van Wijnbergen (1982) mounted a major assault on the McKinnon-Shaw position. The Neostructuralists as the former are called, claim that the advocates of the financial repression theory assume (although not explicitly stated) that the portfolio shift into saving deposit that takes place when the real rate of interest rises is coming out of an unproductive asset like gold, cash, commodity stocks, etc. They argue against this, since in developing countries there may be a flourishing unorganised money market (curb·market) which services the needs of individuals outside the official money market.

The Neostructuralists point out that whether high deposit rates increase the supply of investible funds depends on the reserve requirement ratio and on whether the increase holding of money balances come mainly at the expense of inflation hedges (or these unproductive assets as aforementioned) or mainly from direct lending on the curb market. It is necessary to consider the origin of resources that is deposited in the financial system subsequently to a rise in the real interest rate.

If the increase in money balances occurs simultaneously with a drawing down of gold, idle balances, real estate and in general inflation hedges, then there is a transfer from productively useless to useful assets. Bank lending can be increased and investment rises. If, however, the increase in the real interest rate induces money lenders in the unorganised to pull resources out of the unorganised money market and place them in financial institutions then there can be an overall contraction in credit.

In the unorganised money market the amount of funds that is withdrawn from the system via the reserve requirement ratio is virtually zero. Because of the informal
nature of the unorganised money market there is no reserve requirement ratio. All resources can be made available to investors. In the organised money market, the reserve requirement acts so as to withdraw funds from the financial system. All funds placed in this system are subject to this ratio. Hence if the rise in interest rate induces individuals to move funds from the curb to the organised market, then there will be a withdrawal of investible funds from the financial system. Some resources that were previously made available to investors by the unorganised money market are no longer possible. The higher the reserve ratio the greater will be the level of resources withdrawn from the system. Thus the overall supply of credit (organised and unorganised money markets) will shrink as interest rates rise. There will be a corresponding effect on the level of investment.

Another consequence of the potential rise in the real deposit rate is a rise in the curb market rate that follows the increase in the official market. This increases the cost of capital and distorts prices even further. A rise in the curb market rate also reduces output by deterring investment. Thus the level of investment suffers from a reduction of credit in the organised market and higher interest rate in the curb market.

Therefore, if the substitution of deposits for curb market loans is more important than the substitution of deposits for currency, real estate and other forms of inflation hedges the total supply of investible resources will fall. Based on this analysis the Neostructuralists conclude that as the real rate of interest increases due to financial liberalisation, economic growth is expected to suffer since the total real supply of credit to firms for investment may be reduced. Of course its proponents are assuming that funds flow freely between the banking system and the curb market without incurring additional costs or other inconveniences and that investors use either or both markets. Furthermore, they are assuming that interest rates are already liberalised in the curb market - no intervention takes place by any group, prices are determined by the market forces.¹

¹ According to Cho (1990), the views and policy implication of the repressionists and the Neostructuralist are not completely different. In the McClinnon-Shaw hypothesis developing countries have inefficient financial markets. Liberalisation of the banking system will attract funds from unproductive assets to the official banking sector which will intermediate these funds to provide more efficient investment. In the neostructuralists' view the banking sector is less efficient than the unorganised money market. The latter provide complete intermediation while the former absorb some funds through reserve requirements. Higher interest rates induce portfolio shifts to bank deposits from assets in the informal credit market rather than from currency or inflation hedges. Therefore unlike the financial repression theory, credit is reduced and growth depressed.

In light of this the Neostructuralist advocate a reduction in the size of the inefficient sector (official banking system) and an expansion of the efficient and liberalised sector (unorganised money market). The financial repressionists want to liberalise the repressed sector (banking sector) on the grounds that it is the organised sector and it is more efficient than the unorganised money market. It seems therefore that the real issue is not whether developing countries should liberalise their financial system,
Beckerman (1986) claims "policy makers who use administrative controls to force up interest rates to make them positive in real terms may deepen rather than relieve financial distortion." The view that market clearing rates should always be positive is incorrect as a generalisation. There are circumstances under which market clearing rates may be non-positive. This includes periods in which there are unemployed resources, uncertainty about the economic future, significant liquidity preference and extensive non-financial distortions. Stagflation and financial-system decapitalisation may result if interest rates are forced upwards, above their market-clearing level.

More specifically, Beckerman discusses reasons why market-clearing rates may be non-positive or low. Savings occur even at real negative interest rates. An economy will not simply consume indefinitely where savings offer non positive returns. Businesses and households accumulate liquid savings for emergencies - the precautionary motive. Firms also build up speculative balances despite low interest rates. Investment demand may be very low because of uncertainty and depressed activity. Wealth-holders may face discouraging prospective yields on alternative assets or there may be very few alternative assets. Lastly there may be distortions in other sectors of the economy:

"The low interest rate might be appropriate given the distorted exchange rate. To force interest rates up would be a policy error." Beckerman (1986, page 241)

As result of interest rates being forced upwards, financial firms tend to accumulate excessive resources and an excess supply of loanable funds is likely to appear. By allowing the excess supply firms are increasing their interest payments to depositors which the bank may not be able to earn by increasing their loans since there is a certain percentage of doubtful loans which would not fetch the usual interest payments. Firms may be also be unwilling to lend even if there are borrowers at the

but whether the informal unorganised money market is more efficient than the organised money market.

Whether financial liberalisation is successful depends on the initial assumptions made. If one assumes that the official banking system is more efficient at allocating investible resources than the unorganised market and that households substitute mainly out of unproductive assets when the real interest rate rises, then financial liberalisation raises the total supply of credit and hence investment. If however one assumes that the official banking system cannot intermediate efficiently between savers and investors because of reserve requirement and that households substitute mainly out of unorganised money market loans, then financial liberalisation reduces the total supply of credit and hence investment.
high rates because of the risk involved. Non-financial firms are made less profitable since they are made to pay higher interest rates. Economic authorities are forced to inflate in order to prevent decapitalisation. Higher interest rates may not be deflationary, if money has to be created to facilitate repayments on its liabilities (through increases in the base or the multiplier), its impact becomes inflationary.

Raising domestic interest rates to forestall capital flight does not necessarily provide a solution to the problem. The source of its financing is critical to the final outcome. To the extent that this is accomplished by acquiring questionable assets (rather than productive investment) or through inflationary finance the situation becomes exacerbated. It is almost disastrous to hold funds within an economy which cannot employ them at a yield which covers the cost of retaining them.

Burkett and Dutt (1991) contribute to the critical literature by considering interest rate policies from a Kaleckian perspective. It is a demand-side argument which conflicts with the supply side approach taken by those in the pro-liberalisation camp. In their macroeconomic model, consumption expenditure plays an important role in the analysis as increases of deposit rates may lower investment and growth by placing downward pressure aggregate demand. A rise in the deposit rate increases the supply of deposits and expands the lending potential. The equilibrium interest falls and investment and output increases. But it also increases the marginal propensity to save and reduces aggregate demand output, the rate of profit and investment. Furthermore, the effect may be exacerbated if accelerator effects are introduced in this model. Burkett and Dutt believe that the second effect outweighs the first. This notion can be illustrated using Figure 2.1. Higher real interest rate causes leftward shift of both the investment and savings schedules, and equilibrium level of investment could easily be lower than the financially repressed level.

The long-term effects of a rise in interest rate increases firms' borrowing costs and can cause higher prices. Real wages are reduced, aggregate demand falls, capital utilisation and accumulation are adversely affected. Dutt (1991) points out other influences on aggregate demand which serve to reinforce the downward spiral. Firstly, liberalisation may lead to exchange rate overvaluation. Secondly it could be the cause of large losses by banks which have been engaging in positive maturity transformation. Lastly it increases government's debt service payments and its budget deficit.

The McKinnon-Shaw analysis assumes that deposits create loans (that is, the supply of bank credit is limited by deposits). While this may be true from some developing
countries it is certainly not valid for all. Some have attained the status whereby loans create deposits. Burkett and Dutt (1991) are quick in pointing out that in the economies where the former is true the role effective demand argument is weakened but not totally eliminated. This argument received earlier supported (Chick and Dow, 1988).

Other isolated arguments have also been made against the financial repression theory. It assumes a high degree of aversion because under financial repression financial institutions choose the safest and simplest projects to finance. Its makes the simplifying assumption that the issue can be treated as if there is one single interest rate, say, a representative rate on bank deposits. The key relationship is between the interest rate and saving, all other relations depends on this relationship. The theory of financial repression is often criticised on the grounds that no distinction is made between different types of savings, for example, financial savings and savings in physical assets or private and government savings. Similarly, it ignores the income and substitution effects of a rise in the interest rate. It concentrates on the macroeconomic effects, at the microeconomic level the theory is mute. There is no assurance that higher interest rates remove credit rationing.

Another criticism stems from the definition of the money supply in open developing economies. Attempts at raising real interest rates may have additional distortionary impact because of the nature of the money supply process in Trinidad and Tobago. The orthodox money multiplier model can be written as:

\[ M = \frac{(1 + c)}{(r + c)} \]

where \( M \) is the base of high-powered money, \( c \) is the non-bank sector currency to deposits ratio, \( r \) is the banks' cash reserves to deposit ratio and \( H \) is the monetary base. Its principal sources are government securities and the central bank's loans to the banks, international reserves are a small component of total base money. Insofar as changes in the banks' desired reserve ratio and the public desired currency ratio are stable and predictable the monetary authorities can offset any such changes by altering the stock of base money and so achieve any target level of money supply it desires. This is valid for developed countries where domestic assets held by the central bank tend to heavily outweigh the other items on the sources side of the balance sheet and this may explain the position sometime taken to view high powered money as an exogenous variable, easily manipulated by the authorities.
However, this is not the case in small open oil-rich economies like Trinidad and Tobago. The stock of base money in these economies is backed less by government securities and more by foreign assets. The sources of base money consists of foreign assets, government securities, central bank loans to the commercial banks and government deposits at the central bank. Foreign assets have been and still are quantitatively the most significant component of the source base. A reconstruction of the money multiplier can be found in Farrell (1980):

$$M = \left[ \frac{(1+c)}{(1-f)(r+c-f)} \right] H$$

where $f$ is the banks' foreign assets to deposit ratio. The definition of $H$ is also different because of its different composition to the DCs. Where foreign assets are the dominant item (as in the case of most developing countries) the capacity of the authorities in controlling the money stock is reduced as the 'sources' are no longer under direct control. As a result the money supply becomes endogenous, although some partial control can be extended as far as the domestic factors are considered.

Based on the above analysis for developing countries an increase in foreign exchange reserves will increase the money supply unless there is deliberate sterilisation by the monetary authorities who can reduce monetary credit expansion. In the case of the Trinidad and Tobago economy driven mainly by petroleum an increase in reserves is automatically sterilised since the inflow of reserves accrues largely on the government account and lead to an increase in government deposits. This is the extent to which the authorities can exercise an control on the external 'source'. However technical and political considerations could exert a deep influence on the outcome of such efforts. It is only when the government begins to spend that these reserves are injected into the stream of money flows and money supply actually expands.

As the authorities try to eliminate financial repression through high real rates of interest, one of its aims will be to restrict the level of capital flight and to encourage individuals in the private sector to "bring back" their funds to the economy. If the policy is successful in achieving its goal then by definition money supply would have increased. There may be no sterilisation of such funds especially since the government has little or no control over the destination of funds once it returns to the economy. Commercial banks may have additional resources to circulate. The result will be a increase in the money supply which in turn can stimulate a fall in the interest rate directly or indirectly through a rise in aggregate demand and prices.

21
Similar consequences may follow if the rise in interest rate attracts new external capital, as increases in the interest rate encourages foreigners to place their funds in domestic financial institutions. Furthermore, these problems may be exacerbated if the government choose not to sterilise concurrent export receipts. Under such circumstances a rising interest rate policy objective by the authorities could not be maintained for any considerable time period.

This increase in capital inflow may serve to destabilise the economy especially if policy makers view any increase in the interest rate and the subsequent capital inflow as long-term. If the capital is treated as such it may be used up by local borrowers both in the private and public sector for investment or consumption purposes. However the inherent forces within the economy makes any long term continuation of a high interest rate policy impossible. This will discourage additional deposits and encourage depositors (both local and foreign) to move their capital to more lucrative venues. As asset-holders wish to move their capital a problem arises for these countries. The problem of repayment is exacerbated if the initial capital inflow was used to facilitate domestic consumption. Even if used in productive investment, the gestation period may be considerable. A country may be forced to undertake borrowing as a means to alleviate its' dilemma.

2.5 Transmission Mechanisms
Although McKinnon and Shaw agree that a rise in the interest rate is the appropriate policy prescription to induce growth in a financially repressed economy, there is disagreement with respect to the specific route by which a rise in interest rates is translated into higher levels of saving. McKinnon proposes the complementarity hypothesis while Shaw proposes the debt intermediation view.

In McKinnon's analysis the economies of the developing countries are fragmented. Economic units (households and firms) in these countries face different effective prices for the factors of production - land, labour and capital. They do not have access to the same technology. There is also fragmentation in the sense that the individual's endowment, investment opportunities and his market opportunities for external lending or borrowing are weakly correlated. If an individual has access to financial resources there may be a lack of investment opportunities. An alternative to undertaking actual investment may be the accumulation of funds in the financial system. However he may be constrained because of the lack of financial intermediaries. Similarly if there is scope for investment, individual may not have in
their possession the necessary resources. A solution to the problem lies in external borrowing, however the potential investor is constrained because of the absence or limited facilities to external borrowing.

In this economy there are great discrepancies in the rates of return (McKinnon views economic development as a reduction in the variation of these rates). Economic units are confined to self finance and there are indivisibilities in investment expenditure. Investment requires quantum changes in cash outlays. Self finance in McKinnon's analysis is a situation where there is no operating capital market. Households are self financed in the sense that those concerned provide the labour, make technical decisions, consume, save and invest.

Let us now consider the scenario in a McKinnon-type economy. An individual wishes to purchase physical capital. Being limited to self finance he may either store inventories of his own output for selling or he may accumulate cash balances. The extent to which he relies on a particular option depends on the inconvenience of holding his own product and the real returns of holding money. An increase in the latter will result in greater accumulation of cash balances rather than adding to the level of inventories. Thus, prior to being able to invest, potential investors must accumulate money balances. The higher the real rate of interest the greater the accumulation of money balances and the larger will be the inducement to invest. At the same time the indivisibility of investment means that the demand for money will be larger the greater the ratio of investment to total income. Based on this assumption we can surmise that if the saver-investor's desired rate of capital accumulation increases at any given level of income, his average ratio of cash balances to income will also rise.

These relationships can be embodied in the following money demand function:

\[
\left( \frac{M}{P} \right)^D = L \left( \frac{Y}{Y}, \frac{I}{Y}, d - p^* \right)
\]

(2.3)

where \((M / P)^D\) represents real money balances, \(Y\) income, \(I\) gross investment, \(d\) is the nominal rate of interest on bank deposits and \(p^*\) is the expectation rate of inflation. Money is a conduit whereby capital accumulation takes place. Investment is self-financed and it must be prefaced by savings. The presence of investment opportunities and its indivisible nature creates an incentive to increase money balances. Complementarity is reflected by the sign of the partial derivative with
respect to the ratio of investment of income: $\partial(M/P)/\partial(I/Y) > 0$. The demand for money balances increases as the desire to invest grows.

Furthermore, McKinnon replaces the $(I/Y)$ by a rate of return to capital variable $(r_k)$ and maintains a positive relationship between the latter and the accumulation of real money balances:

$$\left( \frac{M}{P} \right)^D = L(Y, r_k, d - p^*) \quad (2.4)$$

Complementarity is now reflected by the following: $\partial(M/P)/\partial(r_k) > 0$. The complementarity hypothesis rests on the assumption that investment opportunities are plentiful so that it is actually the supply of savings that is the binding constraint and not the demand for investible funds. Accordingly, domestic saving $(S_d)$ can also be substituted for investment:

$$\left( \frac{M}{P} \right)^D = L(Y, S_d/d, d - p^*) \quad (2.5)$$

The key to higher saving and hence investment lies in the real rate of interest. A relaxation of the financial constraint in an economy (the removal of interest rate ceilings) increases the real rate of interest, a higher level of saving is induced, investment rises and economic growth takes place.

In Shaw's model there is segmentation of the markets, prices are not uniform, there is imperfect adjustment, information is expensive and incomplete regarding physical and financial assets. Investment opportunities are not homogenous and risks are regarded differently by savers and investors. Unlike McKinnon there is a clear-cut distinction between the saving and investing sectors. The monetary system comprises of financial intermediaries which attract saving from spending units that forego consumption. They allocate saving to other spending units for private or government consumption or investment. Additionally they exchange their own money for debt of the spending units wishing to augment their money balances.

The debt intermediation view is in contrast to McKinnon's complementarity hypothesis. Holding money involves opportunity costs. Money accumulation is just one form of saving. It is a substitute for saving through a variety of avenues, including the purchase of primary securities, self finance of physical assets or the
acquisition of non monetary indirect financial assets. Shaw formulates a money demand function of the following form:

\[
\left( \frac{M}{P} \right)^D = L(Y_p, rc, r, dn, rm, t)
\]  
(2.6)

where \( Y_p \) is an income variable, \( rc \) a consumer rate of time preference, \( r \) can be interpreted as a vector of opportunity costs, non monetary indirect financial assets are a counter attraction to money and their rate \( dn \) is an opportunity yield in the money-demand function, \( rm \) is the return on money holdings and \( t \) is included to suggest the stimulating effect on money demand of technical progress. This money demand function to illustrate the debt intermediation view can be rewritten in the following form:

\[
\left( \frac{M}{P} \right)^D = L(Y, v, d - p^*)
\]  
(2.7)

where \( (M / P)^D \) represents real money balances, \( Y \) income, \( v \) is a vector of opportunity costs, \( d \) is the nominal rate of interest on bank deposits and \( p^* \) is the expected rate of inflation. Shaw's debt intermediation hypothesis is reflected by the sign of the partial derivative with respect to the vector of the opportunity cost variable: \( d(M/P) / dv < 0 \). As the interest rate on alternative interest-bearing assets increase asset holders engage in asset-switching, from holding money to holding the alternative assets.

McKinnon's complementarity hypothesis can be written as

\[
\left( \frac{M}{P} \right)^D = L(Y, r_k, d - p^*)
\]  
(2.8)

while Shaw's debt intermediation view is represented as

\[
\left( \frac{M}{P} \right)^D = L(Y, v, d - p^*)
\]  
(2.9)

\( (r_k) \) is the return to capital and \( v \) is the vector of opportunity cost. Both variables can refer to the same investment project yet a contrasting relationship is posited by the authors.

A rise in the real interest rate increases savings which is used for future investment by the saver (in McKinnon's complementarity model) or to purchase alternative interest
bearing assets in (Shaw's debt-intermediation model). In any event the resource-base for desired investment expands and actual investment increases.

Molho (1986) by employing an inter-temporal model shows that McKinnon's complementarity hypothesis is not inconsistent with Shaw's debt intermediation view, instead they are mutually compatible. The core elements can be illustrated via a two period model. In the first period the individual is forced to accumulate funds, no investment takes place. This can be rationalised if we consider the fact that financial institutions need to ensure that potential borrowers be in possession of some collateral. Hence they would decline from assisting potential investors in the first period. Also the individual does not, at least, initially have sufficient funds to undertake investment by himself. Thus all first period saving is placed in deposits. Deposits, from this perspective can be viewed as a temporary abode of funds that facilitate the accumulation of resources necessary to satisfy the minimum capital requirement.

In the second period the individual would have accumulated sufficient funds to undertake investment. The saving in the first period has afforded the potential investor with the opportunity to invest. If he wishes to borrow externally, the possession of collateral allows him to do so. The individual is free to invest further saving or accumulate resources in the form of bank deposits. Investment no longer needs to be prefaced by investment in the second period.

Based on this type of analysis the author concludes that money balances in the first period and physical capital in the second period are complementary. While money balances in the second period and physical capital in the second period are substitutes. Hence in an inter-temporal model the complementarity hypothesis and the debt intermediation view can be reconciled.

2.6 An Extension of the Financial Repression Theory
Financial repression defined as a distortion of prices can be extended to incorporate the external sector and an analysis of the exchange rate. As with all equilibrium type analysis, the exchange rate level at which the market clears occurs where the supply and demand for foreign exchange schedules intersects. Many developing countries observe fixed exchange rate regimes. Furthermore it is fixed at sub-equilibrium level - the price of the exchange rate is less than it would have been had its determination been left to market forces. This is analogous to the financial market where the
interest rate is administratively determined at a sub-equilibrium level. In this scenario the country's currency is overvalued.

The nominal price of foreign exchange, defined as one unit of foreign currency expressed in terms of the domestic currency is indicated on the vertical axis of Figure 2.3. The quantity of foreign exchange is represented on the horizontal axis. DD is the demand for foreign exchange and SS, the supply of foreign exchange. The slopes of the curves assume that as a country's currency is devalued (the worth of domestic currency fall in terms of the foreign currency or $P$ increases) more foreign exchange enters the economy. Be it the result of a rise in exports, or just changing attitudes of the individual who wish to make a profit by converting foreign exchange to domestic currency. If exports are elastic then the greater the devaluation of the domestic currency the larger will be the demand for domestically produced goods (exports) and the greater will be the supply of foreign currency.

![Diagram to illustrate financial repression in the foreign exchange market](image)

$P_e$ is the price level as determined by market forces. $P_a$ is the price level at which the foreign exchange is fixed. At this price the foreign exchange demanded is $0Q_2$. Clearly, there is excess demand for foreign exchange equivalent to $Q_1Q_2$. $0Q_1$ will be apportioned according to certain criteria.
At prices below the equilibrium exchange rate there may be adverse consequences. The authorities may choose to sell foreign exchange freely or ration the existing supply $0Q_1$. The latter is more favoured because of the limited quantities of foreign exchange. There is no means of ensuring that any rationing is free from corruption. Non-economic criteria may form the basis in deciding the recipients of foreign exchange. The effect of $P_a$ is analogous to a tax on all activities that generate foreign exchange. All foreign exchange receipts must be surrendered to the authorities at rate $P_a$. Not surprisingly there is reduced incentive to supply foreign exchange. The supply of foreign exchange shrinks further while the demand grows. Importers over-invoice their import requirements, exporters under invoice their export receipts. In order to avoid this penalty individuals who earn foreign exchange may open foreign banks accounts. If this is not possible individuals will prefer to trade in the blackmarket. The general effect will be a negative one, domestic savings fall and the resource base for investment contracts.

The seemingly low price of imports is the source of many difficulties. Because of the nature, structure and history of Trinidad and Tobago (and many other developing countries) there is a high propensity to import. Individual biases are reflected in their attitudes - quality and imports are synonymous. As a result a high level of luxuries and foodstuffs are imported into developing countries. With an overvalued currency the situation becomes exacerbated. It can lead to quantitative restrictions (import quotas) or if there are no restrictions on imports, unsustainable balance of payments deficits occur.

Krueger (1982) discusses exchange control regimes from a similar perspective. The country is assumed to be small and hence unable to affect its terms of trade. It is in full equilibrium at a fixed exchange rate in a constant world price level. Under these conditions, the money supply is increased. Aggregate demand rises and with full convertibility of domestic currency for foreign exchange, domestic residents trade domestic currency for foreign currency and assets. Because of the debilitating effect on international reserves, authorities impose exchange controls in an attempt to prevent or postpone the erosion of foreign reserves. More often than not, rationing rules are devised whereby scarce foreign exchange is allocated.

The policy prescription is similar to the recommendation made by McKinnon and Shaw for the financial system. That is, an increase in the price of foreign exchange or a devaluation of the domestic currency. The implications of a devaluation for developing countries are well documented (Guitan, 1976; Donovan, 1980; Gylfason and Schmid 1983; Johnson, 1987(a), 1987(b); Edwards, 1989).
A distortion in prices appear to plague all sectors of the economy in a less developed country. In the financial sector the interest rate penalises savers and rewards borrowers, while in the external sector it seems to encourage the growth of imports. In the next section an attempt is made to explore the extent to which an overvaluation can be linked to distorted prices in the money market and the foreign exchange market.

2.6.1 Asset Market

In most developed countries there is free convertibility between the domestic and foreign currency. A rise in the interest rate of a particular country is accompanied by an increase in the demand for assets and hence currency of that country. A strengthening of the currency would follow. The reverse is also true, falling interest rates will be associated with a weakening currency.

In LDCs the link between the interest rate and the exchange rate via the asset market is not as robust as in the DCs. This is simply because capital markets in the LDCs are unsophisticated and are at an embryonic stage of development. Commercial banks are the dominant financial institutions and there are limitations with respect to the types of instruments and the maturities. There is generally little scope for the individual to diversify his portfolio into foreign assets because of institutional and legal barriers.

The foreign exchange market functions mainly through the central bank with few foreign exchange dealers. Financial assets in LDCs are seldom perceived as substitutes for financial assets in the DCs. Capital flows to and from LDCs are governed by factors other than interest rate differentials. Aid and long-term capital flows are influenced by political consideration and expectations of political stability rather than pure yield factors. Consequently short-term capital flows which in the DCs respond quickly to changes in interest rate differential, are less responsive in the developing countries given the uncertainty, lack of information and unprofitability.

The underdevelopment of the capital market severs any effective link between the interest rate and the exchange rate via the asset market. If there is a strong link as in developed countries (with a vibrant capital market) then the coexistence of interest rate repression and overvaluation is virtually impossible.
2.6.2 Balance of Trade

If, instead of the interest rate other factors contribute to the determination of the exchange rate then the coexistence of low or negative interest rates and an overvaluation is possible. For example, assume that low interest rates are maintained in country X relative to country Y. Furthermore there is an increase in the demand for the exports from country X. A rise in the demand for currency used in country X would follow and consequently the currency is strengthened. The low interest rate and the strengthening currency in country X appears to be incongruous when compared to the asset market perspective. It is essential to recognise that it is the balance of trade and not the asset market which is the lever to exchange rate determination.

However, this is seldom applicable to LDCs where a fixed exchange rate regime is observed. The Trinidad and Tobago dollar is pegged to the United States dollar. Oil accounts for approximately 70 percent of exports in Trinidad and Tobago. Despite the benefits accrued from the rise in demand for oil and the subsequent price increase there was no strengthening of the Trinidad and Tobago currency per se. Unlike in Britain where there is free convertibility of international currencies, the pound strengthened against its trading partners with the finding of the North Sea Oil. Furthermore, other than oil in Trinidad or bauxite in Jamaica and Guyana, agricultural products are the main foreign exchange earner. The manufacturing and petrochemical industries are at an infant stage. Even so, there is competition from firmly established and efficient producers in other countries. Thus the probability of finding a new mineral or manufacturing a new product that the rest of the world demand at is very small. Hence this mechanism for the simultaneous existence of low interest rate and a strengthening currency via this medium is hardly applicable to the Trinidad and Tobago economy and perhaps generally to most developing countries.

There are other general channels through which interest rates influence the exchange rate. Low interest rates, according to the Keynesian paradigm lead to an increase in the level of investment. This is translated to an income increase and a corresponding effect on demand. The rise in the imported component of demand raises the demand for foreign exchange and places downward pressure on the exchange rate. If the exchange rate follows a fixed regime then a real exchange rate appreciation occurs. If the exchange rate is flexible a depreciation follows.

Within the framework of monetary economics interest rates and money supply are inversely related. In order to clear markets, either interest rates must rise or money supply must increase to accommodate excess demand for money. The lower the level
of interest rates the greater the demand for money. In a financially repressed economy the real interest rate is maintained at levels below the equilibrium rate. Escalating price levels exacerbate the situation. There will be a subsequent increase in money supply and aggregate demand rises. There is an accompanying increase in the demand for foreign exchange as the imported component of total demand rises - with a production structure increasingly dependent on imported inputs and technology and with traditional taste patterns for metropolitan consumer goods the volume of imports is certain to rise. If a fixed exchange rate regime is observed then a real exchange rate appreciation is inevitable, while a depreciation of the currency occurs if the exchange rate is flexible.

With respect to Keynesian and Monetarist views, the coexistence of an overvalued currency and low interest rates is possible when the exchange rate is fixed. However an application of both theories to developing countries is faced with traditional criticisms (Rao, 1952; Hasan, 1960; Lipton, 1969; McKinnon, 1973; Ghatak, 1976). Keynesian theory was developed for developed countries whose structure and characteristics are different from developing countries and hence not relevant. While the money supply process in developing countries is also different from the developed countries. External factors play an important role in the determination of money supply (see page 10).

2.6.3 Currency Substitution, Capital Flight and Inflation Hedges
Low interest rates encourage the public to hold a larger proportion of their wealth and place an even larger proportion of their savings out of current income in inflation hedges e.g. real estate and consumer durables. Individuals may also engage in currency substitution. Additionally low interest rates encourage capital flight. Currency substitution and capital flight exert increasing downward pressure on the exchange rate. If a fixed exchange rate regime is pursued the domestic currency becomes overvalued. This is not sustainable for very long periods. The authorities may be forced to devalue the currency in a bid to restore reserves to some respectable level.

Currency substitution is defined as the demand for foreign money by domestic residents. The determinants of currency substitution include institutional factors, real wealth and the difference between the expected real rate of return on domestic and foreign financial assets (Ramirez-Rojas, 1985). The difference between the expected real rate of return on domestic and foreign financial assets also helps in explaining currency substitution. The differential can be approximated by the expected rate of
depreciation of the domestic currency. It exerts a direct weakening effect on the exchange rate. Capital flight has a similar effect. Currency substitution can serve as an inflation hedge, as well as assisting in satisfying the demand for foreign exchange by domestic residents who receive less foreign exchange than they would like from the official market. It is a profit-making venture for the individuals who intermediate between the suppliers and purchasers of foreign exchange. Currency substitution may preface capital flight. Under these circumstances they are different sides of the same coin. If the latter is impossible, individuals may conceal their foreign exchange reserves. In either case it is withdrawn form circulation. The process of substitution may be continuous, in which case currency substitution is not linked to capital flight but just changes hands.

Currency substitution and capital flight introduce an element of risk in the prediction and estimation of key macroeconomic variables. It reduces the ability of the authorities to control credit. More importantly individuals build up foreign currency deposits abroad at the expense of domestic expenditure and domestic savings. This depresses investment. Government investment may also decrease in the sense that it limits the ability of the government to successfully finance a fiscal deficit by issuing domestic currency.

If restraints are not implemented the depletion of foreign reserves will escalate while a real exchange rate appreciation takes place. However in most LDCs the authorities will try to arrest the process by the imposition of exchange controls, tariffs and quantitative restrictions. These so called curative measures unfortunately postpone rather than eliminate the impending crisis. The real exchange rate will reach some lower bound at which devaluation or some other corrective measure becomes imperative. According Rojas-Ramiras:

"Despite numerous efforts to eliminate monetary substitution and capital outflows, through the use of exchange controls, evidence has shown that these controls have been largely ineffective, leading to the creation of a blackmarket for foreign exchange, a worsening in the allocation of resources, with negative effects on output growth and in general a reduction in welfare."

A parallel market for foreign exchange almost always emerge when there are exchange controls (Culbertson, 1989) and usually associated with an excess demand for foreign exchange on the local market (Grosse, 1992). In Figure 2.3 $P_b$ is the black market rate. Excess demand encourages frustrated individuals to offer
premiums to other individuals who are willing to trade above the official controlled price. To the extent that the black market is illegal the costs of detection play an important role in determining the difference between the official rate and the freely determined rate. Pending devaluation also serve to maintain the blackmarket rate. Government officials and other enterprising individuals may use their position to divert foreign exchange to the black market. Other sources of foreign exchange which will be sold on the curb market rather than the official one include workers' remittances from abroad and revenue from tourism.

It is possible for an economy to simultaneously experience low interest rates and an overvaluation of its currency without any government intervention. However this is highly unlikely for long periods in developing countries for reasons discussed above. Rather, its coexistence can only be artificially maintained by the government. But even through this medium, it cannot continue indefinitely.

2.7 Conclusion
The core of the McKinnon-Shaw thesis is that financial repression is detrimental to the growth of an economy. As a policy prescription the system should be liberalised, that is, constraints on prices, more specifically the interest rate should be removed. This, they believe is the key to a higher level of savings, investment and economic growth.

In this chapter an examination of the theoretical work is undertaken. This includes a discussion on the dynamics of financial repression as well as a critique of the existing literature. As part of the latter special consideration is given to open petroleum economies whose money supply is endogenous and not exogenous.

As an extension of their theory, an attempt is made to incorporate the external sector wherein the relevant policy prescription would be devaluation of a currency which is artificially maintained at an overvalued level. Although the McKinnon-Shaw thesis has received much criticism, there is keen interest in its relevance to developing countries. In the next chapter we proceed to review the empirical literature.

2 When countries, for example, Argentina, Chile and Uruguay are able to borrow large amounts abroad, overvaluation can be sustained for months or even years (See Pfefferman, 1985; Diaz-Aleandro, 1985).
CHAPTER THREE

Financial Repression:
A Review of the Empirical Literature

3.1 Introduction
Many empirical studies have been undertaken following the seminal works by McKinnon (1973) and Shaw (1973). The real interest rate performs several important functions by which it influences economic decisions and ultimately the rate of economic growth. As an instrument of monetary policy it is of crucial importance and consequently it is not surprising that the issues of financial repression and liberalisation have been topics of scrutiny.

An empirical review of the literature on financial repression models is discussed in this chapter. These include models of saving, investment and growth that incorporate the interest rate, inflation or any other financial repression variable as an explanatory variable. Additionally, empirical studies on the transmission mechanisms by McKinnon (1973) and Shaw (1973) will be explored. This chapter is divided into sections depending on the focus of the aforementioned financial repression models. Within each section the discussion follows a thematic form according to the variables specified in the relevant model.

3.2 Saving Models
3.2.1 The Dependent Variable
The first key link in the McKinnon-Shaw hypothesis is that savings will rise in response to an increase in the real interest rate. Several alternative definitions of saving as the dependent variable have been employed. Fry (1978) tested the validity of the McKinnon-Shaw hypothesis for seven Asian developing countries: Burma (1962-69), India (1962-72), Korea (1963-73), Malaysia (1963-73), Philippines (1962-72), Singapore (1965-72) and Taiwan (1962-72). Using annual data in a pooled time series analysis he estimated a saving function, in which the dependent variable was defined as the ratio of aggregate domestic saving to current income (GNP). Giovannini (1983, 1985) utilized the same definition of saving in a bid to reproduce Fry’s (1978) equations using the same set of countries but over a different sample period. These models are estimated using ordinary and two stage least squares. De Melo and Tybout (1986) also employed this definition of saving in their model for the Uruguayan

1 Cross sectional data was employed in this research.
economy for the period 1962 to 1983. But income was specified in terms of GDP rather than GNP.

As an alternative to the domestic savings ratio (Fry, 1979, 1980; Aghevili et al, 1990; Arestis and Demiatriades, 1991) chose to use the overall or national savings ratio. The advantage of the latter is that it represents savings by all nationals unlike domestic savings which is accumulated by individuals currently living in the country. Domestic savings by definition does not include savings in financial institutions by nationals living abroad.

Instead of expressing saving as a ratio, Yusuf and Peters (1986), Gupta (1984, 1987), Ocampo et al (1985), Leff and Sato (1988), and Warman and Thirlwall (1994) utilised total aggregate domestic saving as the dependent variable. The aggregated definition is usually national or domestic savings. The former is defined as national income less consumption and the latter as domestic saving plus net current transfers and net factor income.

The use of aggregate savings as a dependent variable, on its own or as a ratio has come under attack by authors who believe that financial savings is a more appropriate variable (Gupta, 1984; Fry, 1988; Arestis and Demiatriades, 1991; Morisset, 1993; Seck and El Nil, 1993; Warman and Thirlwall, 1994). It is argued that financial savings is the more productive form of savings because financial institutions which collect this type of savings is in a better position to channel resources into the most productive uses. In addition, if domestic credit is the primary asset backing the monetary authorities of the banking system, it is financial savings which indicates the extent to which the supply of credit given by the financial system can be increased. Financial savings thus become the more appropriate medium through which the influence of the interest rate is felt.

Gupta (1984) tested this hypothesis by estimating models of financial saving and real savings separately. The former defined as the change in total financial assets calculated from the liabilities side of the financial institution's balance sheet, while the latter was treated as a residual. Arestis and Demiatriades (1991) estimated financial savings models for Cyprus over the period 1963-1988, however they suggested that the estimate of an aggregate savings function is more straight forward than finding the determinants of the composition of savings. Morisset (1993) also employed a similar definition of saving and estimated financial saving and real saving as separate dependent variables. Financial saving was defined as the change in the stock of money broadly defined. In his study he used three stage least squares to estimate a model for Argentina over the period 1961 to 1982. Warman and Thirlwall (1994) also estimated a
model of financial savings for Mexico from 1969 to 1990. In their study financial savings was defined as the change in the stock of financial assets, it included short term banking instruments, non bank instruments, long term instruments and government bonds.

A similar argument can be made with respect to the inclusion of private saving rather than aggregate saving. In light of this De Melo and Tybout (1986) re-estimated their model in order to take this into consideration, whereby the private savings ratio was used as the dependent variable instead of the aggregate savings ratio. Fry (1979) employed OLS estimation to estimate a saving model for Turkey in which the dependent variable was defined as the ratio of private savings to disposable income. Leite and Makonen (1986) also estimated a private saving model for the BCEAO countries covering the period 1967-1980. They used pooled cross-country data consisting of fourteen observations for each of the six countries.

3.2.2 The Financial Repression Variable
For most authors who examine the validity of the McKinnon-Shaw hypothesis, a test of the impact of financial repression on savings is analogous to a test of the impact of the real interest rate on savings. As an explanatory variable different definitions of interest rates have been adopted by researchers in their attempts to estimate the quantitative impact of changes in the interest rate on saving. Based on the McKinnon-Shaw hypothesis a higher real interest rate is expected to increase savings. If the interest rate is specified in nominal terms along with an inflation variable, say expected inflation, it is expected that a rise in the price level would be associated with a fall in savings. The empirical estimates of the interest rate coefficients, should also provide us with an indication of the type of savings which is most responsive to interest rate changes and hence which is most appropriate as the dependent variable.

In Fry (1978, 1980) the interest rate is measured by subtracting expected inflation from the twelve month time deposit rate of interest. Expected inflation was estimated separately for each country in a demand for money function using the Almon lag polynomial technique. The estimation procedure in this study was two stage least squares (2SLS) with country dummy variables. Eight specifications of the savings equations were estimated for the seven Asian LDCs. In all cases the real rate of interest exerted a positive influence on the ratio of domestic savings to GNP. A similar relationship was found for the Turkish savings model (Fry, 1980). The real interest rate had a positive impact on the national savings ratio, the private and government saving ratios.
In order to assess the robustness of the results obtained by Fry (1978), Giovannini (1983) attempted to reproduce Fry's (1978) equations using the same set of countries but over a different sample period: Burma (1964-1979), India (1964-1979), Korea (1962-1980), Malaysia (1979-1980), Philippines (1965-1980), Singapore (1968-1979), and Taiwan (1970-1980). The models were estimated by using ordinary and two stage least squares. The coefficient of the interest rate was never significant in the instrumental variables (IV) regressions in spite of different specifications. Furthermore, it is negative in six out of eight cases. When the OLS estimation technique is employed the coefficient is positive, but small and insignificant.

Giovannini (1985) again tried to reproduce Fry's (1978) results for the seven Asian LDCs. In the first instance he re-estimated Fry's model for the same period and found no inconsistencies, that is, the coefficient of the interest rate was positive and significant providing support for the McKinnon-Shaw hypothesis. Giovannini then re-estimated this equation, but excluded a few sample observations following Korea's financial reform of 1965. The author felt that these observations had a disproportionately large influence on the estimate parameters over the period 1967 to 1968. The subsequent results indicated a positive but insignificant relationship between the real interest rate and the saving variable. Recognising that this in itself did not represent a total rejection of the McKinnon-Shaw hypothesis, Giovannini proceeded to estimate a model for a larger sample period, extending the period to 1979. The coefficient estimates in these results were negative and insignificant. This provide some empirical evidence to refute the McKinnon-Shaw hypothesis. Based on his results, Giovannini concluded that the relationship between interest rate and saving is dependent on the sample period chosen.

Yusuf and Peters (1984) Ocampo et al (1985), De Melo and Tybout (1986), and Leite and Makonen (1986) also expressed saving as a function of the real interest rate. De Melo and Tybout (1986) tested models of aggregate savings and private savings for Uruguay. When the aggregate savings ratio is used the interest rate coefficient was positive and insignificant. In light of this and other considerations another equation was re-estimated for the Uruguayan economy using the private saving ratio as the dependent variable. The results based on this specification indicated that the real interest rate played no role whatsoever in explaining the private saving ratio, also the previous mild positive relationship completely disappeared.

The authors re-estimated the model over two sub-periods: 1962-73 and 1967-83 in order to detect any structural instability. The split in the sample was determined by the
degree of openness of the economy. Prior to 1973 the trade and capital flows were relatively controlled, thereafter became more uninhibited. For the first period the result suggested that saving was responsive to changes in the interest rate, while in the second period saving was virtually unresponsive to interest rate movements. These results for the latter period did not change when the sample is limited to 1974-83 instead of 1967-83. Also the interest elasticity was considerably larger in the first period when 1974-83 is excluded. The authors claimed that this was because 1970 to 1973 received greater weight and during this period both the real interest rate and real saving were very low. One possible reason for interest rate insensitivity during the second period might be due to the expected rate of devaluation rather than fluctuations in the expected rate of return.

Yusuf and Peters (1984) used OLS and GLS to estimate their model of the aggregate savings ratio for Korea. Twelve equations were estimated with a dummy variable incorporated in some of them in order to capture the second oil shock and its first serious recession. The result provides support for the McKinnon-Shaw proposition. Leite and Makonen (1986) estimated gross private savings for the BCEAO countries using pooled cross country data consisting of fourteen annual observations for each of the six member countries. Eight equations were estimated using the weighted least squares method. In all equations the effect of the real interest rate was positive and significant. In Ocampo's Study for Columbia (Ocampo, 1985) over the period 1959-80 the coefficient of the interest rate was positive and insignificant. Warman and Thirlwall (1994) also estimated a private savings model for Mexico, the influence of the interest rate was positive and insignificant. Based on their results they concluded that income had the most dominant influence on private savings.

Gupta (1984, 1987) unlike others preferred to test the hypothesis of real interest rate responsiveness of saving by distinguishing between the effects of the nominal interest rate and the expected rate of inflation. The interest rate employed was the twelve month time deposit rate. Both aggregate domestic saving and financial savings were estimated in Gupta (1984). With respect to the former, equations were estimated separately for Burma, India, Indonesia, Korea, Malaysia, Nepal, Pakistan, Singapore, Sri Lanka, Thailand and Taiwan. The estimation method was OLS and the period under study extended from 1960 to 1977. The results of Gupta’s analysis provides very little support for the McKinnon-Shaw hypothesis. The influence of the nominal interest rate was either generally negative or if positive, insignificant, Sri Lanka being the only case where it was positive and significant. With respect to the expected inflation variable the coefficient was negative and significant only in the Philippines, in all others it was either positive or negative and insignificant. Even when the real interest rate variable
was employed with the exception of Pakistan, the coefficient was either positive and insignificant or negative.

With respect to the financial saving equation, models for eleven countries were estimated, eight of which utilised the real interest rate as the independent variable. The others utilised the expected rate of inflation and the nominal interest rate. If the real interest rate is employed one would expect a positive relationship, if the nominal interest rate and the expected rate of inflation is employed one would expect the coefficients to be positive and negative respectively (Gupta also estimated models of non-financial savings in which case the relationships are reversed). Only in one instance was the coefficient of the real interest rate incorrectly signed, however it was insignificant. For three of the remaining countries the coefficient was significant. The results for the expected rate of inflation and the nominal rate of interest were as expected. The former was significant in one country (this variable was included in the models for only two countries). While the nominal interest rate was insignificant.

Non-financial savings models were also estimated for ten countries, seven of which utilised the real interest rate as the independent variable, the others incorporated the nominal interest rate and the expected rate of inflation. For those models that employed the real interest rate as the independent variable two of the coefficients were wrongly signed and insignificant. Of those that were correctly signed two were significant. In those models that were specified in terms of the nominal interest rate and the expected rate of inflation all the coefficients were correctly signed and significant in two countries.

These results provide some support for the hypothesis that a change in the interest rate has opposite effects on the components of aggregate saving and hence little or no influence on aggregate saving. Gupta concluded that even if rising interest rates did not influence aggregate saving it can contribute towards accelerating economic growth by mobilising a higher level of saving via a rise in the financial saving component of aggregate saving.

Arestis and Demiatriades (1991) estimated a savings model for Cyprus using annual data covering the period 1963-1988. The result for the interest rate, defined as the actual less the expected rate of inflation, had a negligible and insignificant influence on the savings rate. They also attempted to estimate a model for financial savings, which fitted badly when specified only in terms of the real interest rate and a variable to represent inflation variability. There was much improvement in the overall model when other variables were included. The interest rate coefficient while insignificant in the
first specification was significant in the second. This is a demonstration of an earlier argument. Aggregation can produce deceptive models and policy recommendation may prove more difficult. Interest rates have little effect on the overall savings rate but a significant positive influence on the ratio of financial saving to total savings. That is, it increases the amount of financial savings by reducing the amount of non-financial savings.

Evidence from Morisset (1993) strengthen those of Gupta's and Arestis and Demiatriades'. Applying the three stage least squares method estimation the author illustrated that the real interest rate on deposits had a positive influence on financial saving and a negative impact on total saving. In both cases the coefficients were significant. According to Morisset this seems to be quite compatible with the Argentine experience. The deregulation of interest rates in 1977 was followed by a dramatic increase of saving through the banking system. The build-up of deposits occurred simultaneously with repatriation of capital from abroad and a decline in the demand for public bonds and capital goods.

In the saving equations, Morisset included the expected rate of inflation in addition to the real interest rate. Adaptive and perfect expectation hypotheses were used to measure the expected rate of inflation. This variable seems to have exerted a positive influence on savings, both in physical and financial assets. The result with respect to the latter is inconsistent with a priori expectations, since it is expected that escalating prices erode saving, creates a disincentive towards holding financial savings and a bias towards the accumulation of real assets. This inconsistency according to the author could be explained by the fact that banking deposits have been indexed in periods of high and variable inflation.

Warman and Thirlwall (1994) also estimated models of financial savings and total domestic savings using OLS for Mexico over the period 1960-1990. Their results were very similar to Morisset's, the influence of the interest rate on domestic savings was negative and insignificant. While there was a significant positive impact on financial savings. However they were cautious and warned that although the real rate of interest is a potent instrument for increasing financial savings, the absolute magnitude of change with respect to one percent change in the interest rate is relatively small.

Gupta (1987) used pooled time series cross section data to analyse the effects of the nominal interest rate and expected inflation on aggregate saving for twenty two Asian and Latin American countries (together and separately) over the period from 1967 to 1976. In order to give credence to the McKinnon-Shaw hypothesis the coefficients of
expected inflation and the nominal interest rate must be negative and positive respectively. An examination of the result for the total sample indicated that with the exception of the sign of the nominal interest rate in OLS and TSLS the requirements were not met. Also, the coefficient was not significantly different from zero in any of the estimates. The coefficients of inflation was positive in all methods. Hence there is little support for the McKinnon-Shaw hypothesis when total sample is examined. With respect to Asia, the sign of the nominal interest rate coefficient was correct in all four estimation procedures. But it was significant in the TSLS and Parks (1967) models. While the coefficient of expected inflation was wrongly signed and significant in all the estimates. In the results for Latin America, the coefficient of expected inflation was incorrectly signed and significant only in the Parks model. According to the other estimation procedures expected inflation exerted a negative and insignificant influence on saving. While the influence of the nominal interest rate was positive but insignificant. The individual country results exhibited some support for the McKinnon-Shaw hypothesis.

Unlike these researchers, Leff and Sato (1988), and Aghevili et al (1991) omitted an interest rate variable. Instead they included expected inflation and consumer price index respectively as explanatory variables. It is expected that as inflation increases, the real rate of interest would decline and the level of saving falls. Leff and Sato (1988) estimated a saving equation for twenty one Latin American countries over the period 1955-1983. This saving function was estimated together with an investment function and the method of estimation was three stage least squares. Instrumental variables were used to generate estimates of the endogenous variables income growth and expected inflation. The results indicated that model fitted well, the coefficient of expected inflation was negative and significant. A similar relationship was found by Aghevili et al for eighty six developing countries for the period 1982-1986, but the coefficient on expected inflation was not significant.

Khatkhate (1988) explored the impact of the interest rate on saving but without regression analysis. He examined cross country evidence bearing on the average relationship between each of the macroeconomic variables and the level of interest rate for sixty four less developing countries selected on the basis of data availability for the period 1971 to 1980. The author classified these countries into three groups according to the mean real interest rate prevailing during the period: group A, those with non negative real interest rate (in a range of greater than -2 and above); group B, those with moderately negative real interest rate (in a range between -2 to -5.5); and group C those with severely negative real interest rates (in a range less than -5.5). If interest rates have a significant impact on any macroeconomic variable it will be reflected in a higher
numerical average e.g. if the real interest rate has a significant impact on the saving to income ratio then the average saving to income ratio for those countries in the non negative group should be the highest. However the actual analysis revealed that group C had the highest saving ratio followed by B and then A. This, of course, is in direct conflict to the McKinnon-Shaw hypothesis.

According to McKinnon (1989) the IMF carried out a study similar to that of Khatkhate. For the period 1971 to 1980 the IMF calculated an average real interest rate for each country in a group of twenty one LDCs. Countries were then classified according their average real interest rate was positive, mildly negative or highly negative. These were then compared to real financial growth and real growth in GDP. It is expected that higher growth rates in financial assets are associated with positive real rates. The result indicated that those countries that maintain positive real rates of interest have as expected higher growth in real financial assets.

One shortcoming of these studies is that there is no measure of financial repression other than that of the interest rate. It is the key indicator of financial repression, although some mention is made of the reserve requirement ratio there seems to be no accompanying empirical investigation. An attempt is made in this research to overcome this shortcoming and incorporate other definitions of financial repression. It is difficult to explain the differences in empirical findings. They may be due to different conditions and characteristics in each country as well as the nature of the individuals therein. But even within some countries there are inconsistencies, hence the sample period chosen plays an important role. Policies and their effects change over-time and external conditions affect countries differently. Politics and the role of the government of a country is also important. Developing countries suffer from a lack of data and when it is available it is likely to be unreliable and suffer from omissions.

3.2.3 Empirical Evidence on other Explanatory Variables

The interest rate is not the only independent variable in a saving model. Other frequently used explanatory variables include an income and a foreign saving variable. The former range from rate of growth in income (Fry 1978; Giovannini 1983,1985; Yusuf and Peters 1984; De Melo and Tybout 1986; Leff and Sato 1988), to permanent income (Gupta 1984,1987; Yusuf and Peters 1984), to transitory income (Gupta 1984,1987; Ocampa et al, 1985), disposable income (Fry 1979; Leite and Makonen 1986), per capita income (Fry 1978; Giovannini 1983, 1985), real income (Morisset, 1993; Warman and Thirlwall, 1994) and current income (Yusuf and Peters, 1984;
Ocampo, 1985). Whatever the definition employed a positive relationship is expected between savings and income.

The empirical results indicate that although there is generally no conflict as to the directional relationship between the income variable and savings there is no conclusion as to the significance of the coefficient. There is some belief, however, that income as an explanatory variable in a savings function is more important than interest rates in developing countries (Giovannini, 1985; Warman and Thirlwall, 1994). This is because interest bearing instruments are very few. Individuals are sometimes ignorant or uninterested in the potential role of interest rates. There is a tendency for the transactionary and precautionary motives to be more important than the speculative motive for holding money.

The empirical results for foreign savings are mixed. An increase in foreign saving constitutes an expansion in domestic income, domestic absorption will rise and subsequently domestic saving falls, thus foreign saving can be considered as a substitute for domestic saving and it should have an adverse impact on the savings ratio. On the other hand it may simply augment, that is be complementary to domestic savings.

The coefficient sign of foreign savings in Giovannini (1983) using the instrumental variables estimation was inconsistent with the significant negative responsiveness found by Fry (1978). When Giovannini re-estimated using OLS, although negative, the coefficient was insignificant. The results in Fry (1979, 1980) also exhibited a significantly negative relationship. Using two stage least squares Giovannini (1985), finds the estimates for all models indicated a significant negative relationship between foreign saving and the saving variable. De Melo and Tybout (1986) estimates for the Uruguayan economy over the period 1962 to 1983 were also indicative of the displacement effect of foreign savings on domestic savings. The foreign saving coefficient in Gupta (1987) was positive and significant for all estimates in the overall sample. However when disaggregated the coefficient became insignificant for Asia but remained positive for the Latin American economies, indicating that foreign savings complemented domestic saving.

The accumulation of monetary and physical assets, is constrained by changes in the net real domestic credit to the private sector extended by the banking system and changes in gross real private external debt. If liquidity constraints are taken into consideration then these variables should be incorporated into the model (Morisset, 1993). The effect of external debt in this study appeared to be positive on financial saving and negative but
insignificant on savings in real assets. According to Morisset the increase in external
debt led to capital flight mainly out of real saving. The impact of bank credit was
positive and significant on overall savings and its components.

By including the financial intermediation ratio (defined as the ratio of total financial
assets to income-GDP,) Gupta (1984, 1987) proposed to test the hypothesis that
financial intermediation affects saving directly and quite apart from the effects of the
interest rate. This variable, Gupta warns should only be taken as a directional effect
rather than attaching any meaning to the size of the coefficient.

The inclusion of "uncertainty variables" for example, uncertainty with respect to
inflation may be included (see Gupta, 1987; Morisset, 1993; Warman and Thirlwall
(1984). Individuals misinterpret unanticipated inflation as constituting changes in
relative prices which lead to a reduction in aggregate consumption hence an increase in
saving. High and variable rates of inflation makes the future stream of income more
uncertain as it becomes more difficult to forecast future inflation. Individuals are
assumed to cope with this by increasing the level of saving (Gupta, 1987). However in
this study the uncertainty variable was either of the wrong sign or statistically
insignificant for the overall sample of Asia and Latin America. This was also true for
Latin America when the sample was partitioned, but the results for Asia were positive
in all four estimation procedures, although significant in only one. Warman and
Thirlwall (1984) also found a significantly negative coefficient for uncertainty.
However according to Morisset (1994) uncertainty about inflation may encourage
individuals to protect their saving in the form of capital flight in which case the latter the
coefficient should be negative and significant.

Dependency ratios are sometimes included in saving models. In empirical work
undertaken by Leff (1969) for 74 developed and developing countries as a whole and
with subsets of developed and developing countries, he concludes that there is
pessimism surrounding the possibility of achieving substantial increases in saving rate
of underdeveloped countries unless birth rates are reduced. High dependency ratios,
according to Leff's empirical analysis are among the most important which account for
the great disparity in aggregate saving rates between developed and underdeveloped
countries. His results also assist in explaining the failure of aggregate savings ratio to
rise with increasing levels of income in most underdeveloped countries.

The theoretical analysis and empirical results provoked much criticism. Goldberger
(1992) expressed concern over both empirical and theoretical issues. Gupta criticised
the treatment of all developing countries as a single group, since this hides more information than it reveals. In his study he separated developing countries into three groups depending on the per capita income levels. He empirically showed that dependency ratios were statistically insignificant for the two groups with lower per capita income, but significant for the group with the highest per capita income level. Based on these results Gupta concluded that the influence of dependency in the third group outweighed that of the first two. Consequently it deceives one into thinking that dependency ratios are important factor in determining savings rates in developing countries as a whole. An interesting point is that countries in the lower income groups contribute more than fifty percent of the total group. Gupta suggests that one of the results for the insignificant relationship in the lower income groups is that demographic factors only become important when per capita income reaches a level where it can provide more than a minimum level of living (as illustrated in the third group or countries with the highest per capita income). Potential savings will then be generated and it is only at this point that dependants actually reduce savings. If the minimum level can not be attained no savings will be generated and thus, there is nothing for additional dependants to reduce. In those developing countries which do no attain that minimum standard of living, the criterion for the generation of savings is not met and as a consequence dependency does not exhibit any significant influence on savings and growth rates.

Leff (1976) in defence of his earlier hypotheses claims that at lower income levels "both the precautionary and future income motives for savings and investment would apply with special force." He attributes the results for Gupta's groups (I) and (II) as bias in small samples introduced by errors in measurement. As to Adams' criticisms, he comments that if it is valid, then the implication is such that in the absence of more dependants families will continue in sub-optimising households' allocation decisions, which does not seem to be rational. Also, children are a time-intensive commodity and involves large effect on households' energies which ultimately has a debilitating effect on productivity.

Kelly (1976) concludes "...the issue is largely an empirical one" and according to Hammer (1976) "no simple generalisations are justified. The net effect on an economy will depend on factors which are specific to the country in question." This view is reiterated by Shumaker and Clark (1992). Their empirical results for developing countries in Africa, Asia and Latin America indicate that there is no strong evidence to suggest that increases in population dependency reduces national savings. Similar results were found earlier by Ram (1982) for a group of less developed countries and
he suggests that "the effect of dependency on savings should be regarded as an open issue."

One generalisation which can be made is that savings, despite the definition may be expressed as a function of an income variable an interest rate variable to capture the own rate of return effect, an opportunity cost variable, say, the inflation rate, and foreign saving. These explanatory variables appear to be the ones that are most frequently incorporated in a saving model.

3.3 Investment Models
The second key link in the McKinnon-Shaw hypothesis is that higher interest rates increase investment. The immediate connection is that a higher rate increases savings and hence the equilibrium rate of investment. Also, as interest rate increases, the lowest yielding investment projects are no longer undertaken, leaving only the, more productive ones to be embarked upon and as a result the productivity of investment rises. As financial intermediaries raise the return to savers, they can simultaneously lower real cost to investors by accommodating liquidity preference, reducing risk through diversification, reaping economies of scale in lending, increasing the operational efficiency, and lowering information cost to both savers and investors through specialisation and division of labour.

The impact on investment can also be realised through McKinnon's Complementarity hypothesis. Investors must accumulate resources until the required principal is reached since investment projects by nature are lumpy. As the return on deposits become more attractive investors become more willing to accumulate balances. Savers are investors and savings is followed by investment. In order to test this theory McKinnon (1973) includes the investment rate in the money demand equation.

Most of the empirical studies have tended to focus on the saving aspect. Less research have attempted to model investment within the framework of the financial repression paradigm. There have been attempts to examine the quantitative impact on investment, as well as the qualitative impact via an examination of the response of the capital-output ratio to interest rate movements. The capital-output ratio is a measure of the productivity of investment. According to the financial repression theory higher interest rates enhances the productivity of capital - a smaller amount of capital is needed to produce any given level of output. A fall in the capital-output ratio is associated with a rise in the interest rate. Hence financial liberalisation should be reflected in rising output capital ratios.
Furthermore, many researchers who include the interest rate in the investment equation, do so with the aim of introducing a measure of the user cost of capital, i.e. the loan rate rather than the deposit rate. The a priori expectation is one of a negative relationship. Although these studies focus on the determinants of investment in general and not on the impact of financial repression on the investment, they will be included in the survey to follow. This is because movements in one interest rate is often reflected in movement of the other, that is both the deposit rate and the loan rate tend to move simultaneously and in the same direction.

3.3.1 The Dependent Variable
In defining the dependent variable researchers have utilised private investment (Tun Wai and Wong, 1982; Blejer and Khan, 1984; Haque et al, 1990; Rittenberg, 1991; Morisset, 1993) or total investment (Leff and Sato, 1988; Warman and Thirlwall, 1994) defined as the sum of private investment and government investment. The former is preferred to the latter simply because the relationship between investment and the interest rate may be distorted when government investment is incorporated in the definition of investment. Public investment may take place on the basis of non-economic decisions, for example social and political factors rather than the rate of return may be more important in deciding whether a certain project is undertaken or not. This is perhaps more applicable to developing countries. Under such circumstances the interest rate investment relationship can be misleading. Private investment as a dependent variable may be defined relative to income (see De Melo and Tybout, 1986; Laumas, 1990; Green and Villaneuva, 1991; Pastor and Hilt, 1993; Serven and Solimano, 1993 ) or as total investment as a ratio of income (Warner, 1992; Cohen 1993)

3.3.2 The Financial Repression Variable
De Melo and Tybout (1986) estimated private investment for the Uruguayan economy over the period 1962 to 1983. The effect of interest rate was negative and insignificant. Haque et al (1990) estimated a small econometric model, their results indicated that the coefficient on the interest rate although small, was negative and significant at the five percent level.

The results of Green and Villaneuva (1991) showed a strong inverse relationship between investment and interest rates. Based on twenty three LDCs they examined the influence of the interest rate among other variables upon investment. According to the
authors they provided a preliminary look at how various macroeconomic variables affect private investment. They did not attempt to build and estimate a full scale structural model, rather their work is more of an exploratory nature. They utilised pooled time series data. Equations are estimated for the entire sample period 1975 to 1987 and for two sub periods: the pre-debt crisis (1975-1981) and the more recent period (1982-1987).

Three different measures of the real interest rate were tried: one using the current period value of the percentage change in consumer price index, another using the previous year's value and lastly, one using the value of the year ahead which the author notes is conceptually the correct specification. The best results were derived from the equation which utilised the third definition. The results indicated that the coefficient of the interest rate was negative and significant - a one percent rise in the real interest rate would reduce private investment by less than one tenth of a percentage point. The results did not change when the model was re-estimated for the sub-periods. This relationship is not consistent with the McKinnon-Shaw hypothesis, whereby higher real interest rate should serve to deter investment by raising the user cost of capital, rather than to encourage it.

Both Rittenberg (1991) and Warman and Thirlwall (1994) found that interest rate had a negative impact on investment in Turkey and Mexico respectively. Rittenberg suggested that when interest rates are less than their equilibrium level, investment is constrained by savings and a rise in the latter is necessary to obtain higher investment levels. While investment declines with an increase in interest rates at levels higher than the equilibrium rate. This can be illustrated in the following diagram where $r_0$ is the equilibrium interest rate.

![The Effect of High Interest Rates on Investment](image)

Figure 3.1
The Effect of High Interest Rates on Investment
Rittenberg employed Quandt (1958) switching model to test his hypothesis. Although this general pattern was reflected in the results, there was also evidence to suggest that highly negative and highly positive interest rate can be detrimental. Warman and Thirlwall (1994) adopted a similar approach. However in their study the interest rate was never positive. While this is consistent for movements above the equilibrium rate it is in conflict for those below the equilibrium rate. An explanation offered is that the interest rate was far below the equilibrium rate, that is, it was too negative.

Demetriades and Devereux (1992) estimated a model of investment using panel data for sixty-three developing countries. Their results suggested that interest rate ceilings may reduce the overall cost of capital and increase the rate of investment. In addition, they did a direct test of the McKinnon-Shaw hypothesis and found that the domestic real interest rate had a negligible and statistically insignificant influence on investment.

Morisset (1993) used three stage least squares to estimate the investment model for Argentina over the periods 1961-1982. Although not directly included in the investment equation, Morisset's model can be used as a basis for deriving the short run total response of private investment to an increase in the real rate of interest. This is achieved by calculating the total short-run elasticity of the main endogenous (of which private investment is included) of the model to a one percentage point increase in the real interest rate. The simulation results indicate little response to interest rate changes. Furthermore, the direction of the relationship is inconsistent with the McKinnon-Shaw hypothesis. This, according to Morisset, is largely due to the shift from capital goods to financial saving. The increase in monetary liabilities in response to rising interest rates is favourable to private investment via the expansion in credit. But the portfolio shift undermines the private sector's willingness to hold capital goods and government bonds. Implicit in the latter, is the fact that the government will place greater reliance on the banking system for funds to finance its deficit. In an attempt to prevent an expansion in the money supply the banking system is forced to keep the private sector under strict control and hence private investment suffers as the government borrows to finance its deficit. The final impact on investment depends on whether the increase in financial savings is larger or smaller that required by the government to finance its deficit. The empirical result seem to indicate that the negative impact of the latter is greater than the positive and consequently the total effect of the real interest rate on private investment is negative.

Unlike those aforementioned Laumas (1990) demonstrates support for the McKinnon-Shaw hypothesis in the Indian economy. The sample period extended from 1954 to
1971 and the method of estimation was by two stage least squares. The results indicated that the real deposit rate coefficient was significantly positive. In a bivariate model for twenty one African economies over the period 1974 to 1989, Seck and El Nil (1993) also found a positive and significant impact of the real deposit rate on the overall investment rate.

The research into the impact of financial repression on investment is not as numerous as that on savings. It can also be criticised for restricting the definition of financial repression to include only the interest rate. Moreover, empirical investigation into this relationship may not be undertaken because of simplistic inferences for investment based on results obtained from models which examine nature of savings and financial repression. As in the saving model, the literature reviewed indicates that the issue of investment responsiveness to interest rate movements can only be resolved by empirical investigations.

3.3.3 Empirical Evidence on other Explanatory Variables

Investment is specified as a function of other variables. A rise in income induces a rise in the investment rate. Income as an explanatory variable may be defined in a variety of forms. Green and Villaneuva (1991) included both lagged percentage change in real GDP per capita and lagged level of per capita GDP. Both were found to have positive impact on private investment as expected, however the latter was insignificant. De Melo and Tybout (1986) included current and lagged real income growth. The coefficient estimates of both variables were positive but insignificant for the former. Leff and Sato (1988) utilised current income growth. However, real income in Morisset (1993) appeared to exhibit a negative but insignificant influence on private investment. Gross national product (Laumas, 1990) or gross domestic product (Greene and Villaneuva, 1991) were used as the basic income variable.

Government investment may augment private investment or it may crowd out private investment. Sundararajan and Thakur (1980) developed a model for India and Korea in order to highlight the impact of public investment on private investment and growth by looking at various channels through which the latter can influence the former. With respect to India, there was crowding out in the initial period but a stimulation of private investment in subsequent periods. However the augmentative effects were weak so that the initial negative impact could not be offset for sometime. Hence there can be an overall negative influence. The results for the Korean economy were positive and large in the immediate and subsequent periods. Tun Wai and Wong (1982) examined a flexible accelerator theory of investment with emphasis on five developing countries.
The results indicated that government investment as an explanatory variable may have a contributory effect private investment.

Blejer and Khan (1984) included both the level and the change in public investment in their model of private investment. They concluded that it is not the level of public investment that crowds out the private sector since the coefficient was positive, rather it was the change that has a strong crowding out effect. In Green and Villaneuva (1991) the coefficient of government investment was positive and significant suggesting that public investment supplemented private investment. This was also true for the Argentine economy as shown by Morisset (1993). Serven and Solimano (1993) estimated private investment for a group of fifteen developing countries over the period 1975-1988. Once again, the role of public investment was a contributory one. However public investment in Laumas (1990) crowds out private investment in India. In his model the coefficient was negative and significant. The contribution of public investment is also negative in Khan and Rheinhart (1990). Their model of private investment was estimated for a cross section sample of twenty-four developing countries over the 1970s.

Investment like saving can be expressed as a function of its own rate. In less developed countries this might present a problem because of the lack of data. It is expected that as the rate of return on investment rises, the level of investment undertaken will increase. Laumas demonstrated that this relationship for India over the period 1954/5 to 1974/5. A proxy was used for the rate of return on investment by dividing the sum of profits before tax depreciation provisions and other provisions by the value of gross fixed asset. Data were gathered from medium and large joint stock companies in India.

A country's debt level and debt service payment can be seen as a burden on the economy. Greene and Villaneuva (1991) illustrated the validity of this inverse relationship in their study based on twenty-three LDCs. Similar results were found by Pastor and Hilt (1993) for Latin America and Serven and Solimano (1993). On the contrary Morisset (1993) anticipated a positive relationship between real gross private external debt and private investment since the former is a source of funds to finance investment. However the coefficient estimate indicated otherwise. This suggests that external debt eroded, rather than enhanced private investment.

Warner (1992) took a different approach in examining the impact of debt on investment. In his study he examined out-of-sample forecast of investment over the debt crisis period (1982-1989). These forecast should not track investment during the
debt crisis if the debt crisis effects were important, but should track investment if they were not. In his result, the equation can forecast investment in many indebted countries and hence cast doubts on debt-related explanation for declining investment.

The credit facilities offered by financial institutions provide the necessary funds for investment (Fry, 1980; Tun Wai and Wong, 1982; Blejer and Khan, 1984; Leff and Sato, 1988; Morisset, 1993; Warman and Thirlwall, 1994). Fry (1980) included the ratio of domestic credit to GNP as well as its rate of change. He estimated various specifications of the investment model for sixty one developing countries. The results suggested that domestic credit has a positive influence. Tun Wai and Wong (1982) and Blejer and Khan (1984) included a variable to represent the sum of the change in credit to the private sector and net capital flows. In both cases there was a positive impact. However when included on its own Tun Wai and Wong (1982) found some evidence of a negative influence.

In Leff and Sato (1988) and Morisset (1993) investment is expressed as a function of the change in real credit to the private sector. Leff and Sato, in a study of twenty-one Latin American countries, showed that the change in credit availability enhanced the level of investment that can be undertaken. According to the authors this variable must be expressed as distinct from the interest rate variable in countries where the financial markets are repressed. A similar result is found by Morisset (1993) for the Argentine economy. In addition to the credit available from the financial system a firm's internal funds are also available for investment. Morisset approximated the firm's cash flow with the difference between potential and effective levels of production as measured by the Wharton index. The estimated coefficient for this variable is positive and significant. Warman and Thirlwall (1994) included the supply of credit and found a positive impact.

In general an investment equation for developing countries includes an income variable while the inclusion of other variables depends on the availability of data. These may include credit to the private sector by private financial institutions or through government assistance, the real interest rate or foreign debt. One variable which is seldom included in such models is the profitability of potential projects (the internal rate of return) because of measurement problems (see Laumas, 1989).
3.4 Growth Models

The impact of financial repression on growth is in fact a combination of its impact on savings and investment. As rising interest rates increase savings and the quality and quantity of investment, economic growth occurs. Most studies do not explicitly propose an economic link between financial repression and growth. As already mentioned empiricists have an inclination to focus on savings and make inferences about the potential impact on growth (Fry, 1978; Gupta, 1984; Giovannini, 1983,1985). It is only the more recent research which directly incorporates the aspect of economic growth (Roubini and Sala-i-Martin, 1992; Warman and Thirlwall, 1994).

Barro (1990) utilising data for ninety eight countries for the period 1960 to 1985 explored the determinants of real per capita GDP. The result of this study indicated that growth was positively related to initial human capital and negatively to the initial level of per capita GDP. Furthermore it was inversely related to the share of government consumption in GDP, while public investment has little impact on growth. Political stability had a positive impact while market distortion had an adverse influence on growth. Regional dummies for Latin America and Africa were added to the basic regression and the result showed a negative and significant influence. Roubini and Sala-i-Martin (1992) however claimed that the regional dummies were in fact proxies for other variables that were omitted from the specification. They proceeded to expand Barro's model by introducing a number of measures of financial repression.

Roubini and Sala-i-Martin (1992) explored the empirical relationship between economic growth and different measures of financial repression. The authors attempted to improve on a study done by Barro (1990). They begin from the model formulated by the latter and add measures of financial repression. The objective was to test whether after controlling for the usual determinants of growth in Barro's study, the degree of financial repression contributed to explaining economic growth. The authors also tested whether the significant regional dummies for Latin America growth found by Barro could be explained by financial repression in that area.

The first proxy employed was a dummy variable that took a value of one when real interest rates are positive, two when negative but greater than -5, and three when less than -5. When this dummy variable is included the coefficient was negative and significant indicating that a higher degree of financial repression lowered economic growth. Furthermore, with the inclusion of this proxy the regional dummy lost its statistical significance and its estimate dropped by more than a half. This suggested that one of the reasons for the significant regional dummy might be the high degree of financial repression.
A composite index of distortion in the financial market, factor market and trade was introduced into the growth regression as the second proxy of financial repression. This dummy took a value of one when distortions were low, two when medium and three when high. The coefficient estimate of this proxy was negative and significant. Also the regional dummies lost their statistical significance when the financial repression proxy is included.

A third proxy took the form of a dummy variable equivalent to a zero/one variable, taking the value of one when real interest rates are negative. The coefficient estimate of the proxy was negative and insignificant. However, when the proxy was redefined taking a value of one when interest rates are strongly negative, the coefficient became strongly negative. This suggested that while a moderate degree of financial repression may not excessively affect economic growth, a strong degree of financial repression was associated with significantly lower economic growth. The estimate of the dummy was reduced but remains significant when this proxy is included in the growth model.

Another proxy was defined as the ratio of commercial bank reserves to money supply. It was expected that economic growth would be lower in those countries with a higher ratio of reserves to money. Although correctly signed, this proxy was not sufficient to reduce or eliminate the significance of the regional dummies. An inflation variable was also added to the model as a financial repression proxy. The result indicated that it had the correct sign and statistically significant - a higher level of inflation was associated with a lower level of economic growth.

Based on these results the authors concluded that financial repression will lead to a lower level of economic growth. When proxies of financial repression were included they are found to be negative and in most cases statistically significant. Where the latter holds, regional dummies lost their significance. According to Roubini and Sala-i-Martin (1992) financial repression constituted to explaining the low level of economic growth in the regions concerned. The result of this study suggest that one should be cautious in interpreting dummy variables. Its significance might be attributed to a more relevant but omitted variable. Furthermore, rather than including the actual interest rate as a variable to capture the existence of financial repression, a dummy is created. But the value the dummy assumes depends on the level of interest rate.

Arestis and Demetriades (1991) estimated a growth model in which the savings rate and financial savings were included as explanatory variables. Their results indicated that there is some influence through the financial savings component. Although
positive in both models the interest rate was only significant in the financial savings model. Both the overall saving rate and the financial saving rate were significant when included in the growth model. This suggests that while the real interest rate does not have any significant influence on income growth through the saving rate, there is some influence through the financial saving rate. Although no estimates were provided the authors also investigated whether the real rate of interest had an independent effect on the growth rate, that is, other than via financial savings. The McKinnon-Shaw hypothesis was rejected. The authors concluded the impact of interest rate on economic growth was only an indirect one.

Warman and Thirlwall (1994) tested the theory of financial liberalisation in the Mexican economy for the period 1960-1990. They found a negative and insignificant influence on growth. Their general conclusion was that even though rising interest rate increases the flow of financial savings there is no evidence that it leads to higher economic growth.

Some of the other explanatory variables that have been included in the growth model includes different measures of human capital (Barro, 1990; Otani and Villanueva, 1990; Knight et al, 1993; Morisset, 1994) exports (Ram, 1985; Otani and Villanueva, 1990; Warman and Thirlwall, 1994), government savings (Warman and Thirlwall, 1994), foreign saving (Warman and Thirlwall, 1994), savings ratio (Otani and Villanueva, 1990; Arestis and Demiatriades, 1991; Seck and El Nil, 1994) investment rate (Robinson, 1971; Ram, 1985; Yaghmaian, 1994), public investment (Knight et al, 1993), labour force (Ram, 1985; Robinson, 1971; Tyler, 1980; Yaghmaian, 1994), the growth rate of the population (Otani and Villanueva, 1990) and debt (Otani and Villanueva, 1990). The empirical evidence put forward makes any conclusive statement about the McKinnon-Shaw impossible. In some countries it is refuted, in others it is not. Once again the relationship varies with respect to country and the time period. In other words, it remains an empirical issue.

Dornbusch and Reynoso (1989) were highly critical of financial liberalisation. They write:

"It is fair to say that the financial repression paradigm in some ways seem like supply side economics - a kernel of the truth and a vast exaggeration." (page 204)

Furthermore

"The evidence on the beneficial effect of removing financial repression remains open to challenge."

(page 209)
It is interesting to consider the actual experiences of countries which implemented financial liberalisation policies. This can provide us with an insight of the consequences of measures to reduce financial repression (financial liberalisation). Such an examination can also assist other countries in their own policy making process. Chile initiated its liberalisation programme in 1974. Only two years later a financial crisis was already emerging. Savings did not increase in spite of the increase in real interest rates (Velasco, 1988). Investment did not show any large increase in either quantity or quality (Diaz-Aleandro, 1988). The economic growth that did occur during the liberalisation period was "fuelled to a great extent by foreign borrowing" (Gibson and Tsakalotos, 1994). Writing about South Korea these authors state

"Financial repression is not always detrimental to economic growth - government intervention can have some role to play." (page 603)

Neither Chile nor Korea are unique. The experiences of Taiwan is similar to the latter. Although interest rates were never largely negative the government was very much present in maintaining tight control over the interest rates and credit allocation. Other Latin American countries suffered the same fate as Chile - Argentina and Uruguay. Copoglu (1990) examines the effects of liberalisation in Turkey and he found that these reforms made little difference in savings and investment.

3.5 Transmission Mechanism Models

Researchers have also attempted to model the transmission mechanisms postulated by McKinnon (1973) and Shaw (1973). McKinnon's transmission mechanism is founded in the complementarity hypothesis. Because economic units are self financed and investment is lumpy, potential investors must accumulate money balances prior to the investment process. While Shaw's debt intermediation view is based on external financing. Savers are not necessarily investors and there are alternatives to money balances.

In the McKinnon transmission mechanism real money balances are expressed as a function of the ratio of gross investment to income (in addition to an income and an interest rate variable). The presence of investment opportunities creates an incentive to increase money balances, since investors are confined to self finance. The saving to income ratio is often substituted for the investment variable because it is assumed that investment opportunities are plentiful, consequently the former is actually the binding
constraint and not the demand for investible funds (Fry, 1978; Thorton and Pondyal, 1990; Thorton 1990). If McKinnon's complementarity hypothesis is to be accepted this coefficient must be positive and significant.

In the debt intermediation view real money balances are expressed as a function of the opportunity cost of holding money, amongst other variables - an income and an interest rate variable. If this model is to be applicable to an economy, its' coefficient must be negative and significant.

Fry (1978) tested the applicability of both hypotheses in a study mentioned above. He illustrated that the coefficient of the investment to income ratio is negative and significant implying that large cash balances need not be accumulated prior to investment, hence the countries in this sample cannot be classified as self financed. The complementarity hypothesis was thus not valid in these economies. Rather, the results showed a preference for the debt intermediation view. There was substitution between money and other financial assets as shown by the negative and significant opportunity cost coefficient (the yield on government bonds).

Thorton and Poudyal tested for complementarity in Nepal over the period 1974-1987. The result indicated that the coefficient of the saving to income ratio was positive and significant. A similar result was found for India over the period 1964-1984 by Thorton (1990). These results are contrary to those found by Fry.

Thorton points out that whether there is support for the complementarity hypothesis or the debt intermediation view depends on the development stage of an economy. There will be a tendency for those countries on the lower end of the development scale to exhibit support for the complementarity hypothesis. While the more developed an economy is the greater will be the evidence in favour of the debt intermediation view.

3.6 Conclusions
The impact of financial repression on savings, investment and growth varies with different economies and different time periods. What holds for one economy may not hold for another. Furthermore, what holds for a particular economy during a specified time frame, may be different from another time period. Each economy within the developing world must be seen as distinct from another, consequently the empirical conclusions and policy implications for one economy cannot be accepted uncritically for another economy. The results thus far with respect to financial repression are inconclusive, the issue at hand is an empirical matter and it can only be resolved in an
empirical manner. The impact of financial repression and the possible success or failure of financial liberalisation must be seen as idiosyncratic to a particular economy at a particular period in time.

Furthermore, caution should be taken with the interpretation of empirical results, moreso where policy prescription are dependent on these results. For example while savings is positively related to the real interest rate there might not necessarily be a connection between financial liberalisation and investment or economic growth. That is, there is no assurance that savings will be translated into investment. This is a common inference by empiricists which may be misleading. Similarly, real interest rates may not be a significant determinant of savings, but through other channels can lead to economic growth. Some mention of this has already been made, higher interest rate which may have no impact on savings may increase the productivity of investment and economic growth.

One of the main shortcoming of studies that explore the concept and impact of financial repression lies in its definition. Most of the studies restrict the definition to include only the interest rate. In chapter four some alternative definitions are discussed, with respect to both the domestic financial sector and the external sector. Although not new, the cointegration methodology seemed to be rarely employed by economists when examining financial repression. This also forms part of the discussion in the next chapter.
4.1 Introduction
In this chapter the methodology which is employed to estimate models of savings investment and growth for the Trinidad and Tobago economy will be reviewed. The various indicators of financial repression will also be discussed as well as the data sources. The cointegration approach is adopted in estimating the models. The Engle-Granger approach is found to be more relevant than the Johansen maximum likelihood approach because of the limited nature of the data set for Trinidad and Tobago. Additionally, disequilibrium econometrics is used to estimate a model of savings and investment. This, however forms the core of another chapter (Chapter 8).

Unlike other economic indicators there is no one specific variable to represent financial repression. Six alternative proxies will be incorporated in the models in an attempt to represent the various interpretation of financial repression and measure the importance of its effects. Based on the theory it is expected that a reduction in the level of financial repression would serve to enhance the mobilisation of domestic savings, despite the definition that the proxy assumes.

In this study the proxies of financial repression are defined as follows:
(1) The Real Interest Rate
(2) A Dummy Variable
(3) The Reserve Requirement Ratio
(4) The Inflation Rate
(5) The Foreign-Domestic Interest Rate Differential
(6) A variable to represent the deviation of the actual exchange rate from its equilibrium level.
Each of these alternative measures is discussed below.

4.2 Measuring Financial Repression
4.2.1 The Real Interest Rate
The conventional variable which is adopted to represent financial repression variable is the real rate of interest. This is defined as the nominal rate less the rate of inflation. Inflation in turn can be defined as the actual or the expected rate. In this model the relevant interest rate is the savings deposit rate. Based on the theory of financial repression a rise in the real interest rates (lower degree of financial repression) induces
a rise in savings. The individual responds to a rise in the interest rate by increasing the proportion of his wealth in interest earning assets, simply because he now has the opportunity to earn more income from his current level of wealth and can earn additional income if he adjusts his portfolio in favour of the asset whose interest rate has increased. Alternatively if the interest rate falls the rational saver is inclined to reduce his interest earning deposits.

A rise in the interest rate will only increase saving if the substitution effect is greater than the income effect. Assume an individual wishes to accumulate a desired saving level in a fixed time period. There is however an unexpected rise in the interest rate halfway through the period. The individual may subsequently reduce his saving (the rise in the interest rate will compensate for the reduction in saving) and successfully attain the desired saving level without altering the time period. If this happens the income effect of a rise in the interest rate outweighs the substitution effect and a rise in interest rate induces a fall in the savings. This analysis may be more applicable to contractual saving be it defined as an individual saving a fixed amount every month without having an obligation to do so, or to an individual saving a fixed sum because of an obligation (e.g. in repaying a debt of some kind).

When dealing with developing countries caution should be taken before accepting an unequivocal positive relationship between savings and the interest rate. A rise in the interest rate in developing countries may not be followed by an increase in savings for a variety of reasons. For example, a substantial portion of saving takes the form of contributions to social security, retirement funds or other forms of contractual savings which would be forthcoming regardless of the rate of return on them. When there is a decline in the interest rate, contributions to contractual savings remain unaffected. In other words, savings for a specific purpose are insensitive to changes in the interest rates. As in other developing economies the main aim of rural savers in Trinidad and Tobago is for posterity, as little as it may be, or for that "rainy day" if necessary. The absolute level of interest rate in some instances play a small role in their decision to save. In some cases the relative interest rate offered by different financial institutions may assist in the decision.

The issue of locational convenience must also be taken into consideration. In Trinidad and Tobago attempts have been made to overcome this problem. In the late eighties the population per bank office was approximately 10,500 with banks and banking services accessible to most of the rural population. In developing countries income levels tend to be much lower than developed countries and societies are more agrarian in nature. There is some degree of subsistence-living. Above consumption expenditure, families
have little income left and hence there is little left to save whether or not interest rates are high. Income levels are just too low to allow interest rates to play any role. Economic and political instability may also inhibit the effectiveness of interest rates. Measures associated with a stable macroeconomic environment, no debt servicing difficulties and political stability may have more powerful effects on savings than those adopted within the context of uncertainty.

If an economy is financially repressed the process may be even further complicated. Using the indicator of ex-post positive or negative real interest rate, the economy of Trinidad and Tobago can be defined as a financially repressed economy. In the last two decades the real interest rate on saving deposits has been negative. In fact for the period 1974 to 1984 the economy can be defined as severely financially repressed. The highest real interest rate attained during this period was -6.95%. In 1980 the real rate of interest was recorded was -14.3%.

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</tr>
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<tr>
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<td>-0.7</td>
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<td>-1.5</td>
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</table>

Table 4.1
Real rates of interest for the period 1960-1991
There has been some improvement in the situation in the early nineties but it is yet to be seen whether the real interest rate will attain a level of zero. The latter has been mainly because of the pressure placed on the policy makers by the International Monetary Fund (IMF). Two standby arrangements were made with the IMF in 1989 and 1990 as well as a structural adjustment loan with the World Bank in 1990. With an economy exhibiting these characteristics it is no surprise that the portion of the population that responds to interest rate movements is discouraged from holding interest bearing assets. Even when there is an improvement, rates are negative and there may still be little incentive to attract asset-holders.

If the McKinnon-Shaw hypothesis is to be accepted the coefficient of the interest rate should be positive. This would suggest that savings will decline when there is lower real interest rate and consequently corrective financial liberalisation policies should be considered as the mechanism for achieving a higher saving rate.

4.2.2. Dummy Variables

The real interest rate is just one measure of financial repression. Other proxies of financial repression will also be considered. Firstly, dummy variables (Roubini and Sala-i-Martin, 1992) will be used to represent different levels of financial repression. For example, a dummy of zero when real interest rates are positive and one when negative. Alternatively, the dummy variable may be defined as one when real rates are severely negative (less than -5.0%). In this analysis the responsiveness of savings to different degrees of financial repression is examined. For example, it may be possible to conclude that while moderate financial repression may not excessively affect savings and economic growth, a strong degree of financial repression may be associated with significantly lower levels of savings. That is, for any length of period, changes in the coefficient of the financial repression variable (a change in the slope) would be noticed.

So at high levels of financial repression the coefficient of the financial repression variable would be very small-if positive (or it may even be negative) indicating that savings are not very responsive to interest rates when financial repression is at a high level. This is represented in Figure 4.1 as the steeper portion of the curve below the zero rate of interest. Conversely at lower levels of financial repression savings become more responsive to interest rate changes (the more gently sloped portion of the curve-that segment above the horizontal axis). In other words the interest elasticity of saving increases as the real interest rate increases. In Figure 4.1 the kink is at a real rate of zero for convenience. In reality the point at which the kink occurs depends on the perceptions of the asset holder. For some it may be below zero, for others above.
4.2.3. The Commercial Banks' Reserve Requirement

Another proxy is the reserve requirement ratio of commercial banks. Higher reserve requirement ratios inhibit upward movement of the interest rate and can result in a perpetuation of financial repression, a high reserve ratio proxies for the degree of financial repression and it is expected that savings, investment and economic growth would tend to be lower in countries with a higher reserve ratios. Assuming that banks hold all the high powered money and the public hold all deposit money, with a required reserve ratio of ten percent and hundred pounds of deposits, ten pounds must be set aside as reserves and ninety for lending. A loan rate of ten percent has to be spread over £100 deposits, the deposit rate, in this scenario cannot exceed nine percent, assuming that the inflation rate is zero and there are no banking costs. If we allow the reserve requirement ratio to increase to twenty percent then the deposit rate cannot exceed eight percent.

Lower reserve requirement ratios have two effects. Firstly, it allows the banks to finance private sector investment from a given volume of deposits and secondly, for any given loan rate the competitive rate of deposit is raised, thus contributing to reducing real negative interest rates. Although the variable is often referred to as an indicator of financial repression, it is seldom ever incorporated in models as an explanatory variables. One of the reasons for this might be due to the assumption that the interest rate and the reserve ratio are different sides of the same coin, that is
movements in one follow movements in the other. As such to include one in the model implicitly includes the other because of this dependence. However in developing countries the orthodox interdependence of both variables may not necessarily be valid. Governments through the central banks can dictate movements in one without changing the other. For this reason it is important to examine its impact as a distinct form of financial repression on the relevant economic indicators.

4.2.4 The Rate of Inflation
The fifth proxy of financial repression is the inflation rate. Inflation represents a tax on savings as higher rates of inflation erodes accumulated funds. By expanding the tax base for seignorage financial repression will induce the government to choose a higher level of seignorage tax, that is a higher inflation rate. If the inflation rate is higher than the nominal deposit rate then the real worth of savings decline overtime. From this perspective, savers can be perceived as being penalised for postponing current consumption. Higher inflation levels encourage asset-holders to hold inflation hedges. Hedges, in the form of fixed assets, foreign currency and, or foreign assets which are held in an attempt to protect individuals wealth against potential losses may infer that savings in domestic interest earning assets will start to dwindle as savers participate in this activity. The theoretical model suggests that countries which are characterised by financial repression will witness higher rates of inflation. It is expected that higher rates of inflation and hence financial repression will be associated with declining savings.

It is tempting for developing countries to resort to inflation as a major tax in order to finance their public expenditure to promote economic development. Low to moderate inflation can be beneficial to an economy, by increasing profitability of industries inflation can provide incentives to investment. The government may be less obliged to depend upon foreign resources (aid or debt) if it can raise more revenue at home. Also, it has been argued that inflationary financing could promote the growth of financial intermediaries, which may in turn encourage the public to hold more financial rather than physical assets and thus release resources for the growth process. The attainment of these aims is perhaps only possible if the economy can maintain low rates of inflation. Most developing countries are unable to do so simply because the causes of inflation are outside their control, for example through imported inflation and the money supply process.
4.2.5 The Foreign-Domestic Interest Rate Differential

Financial repression can also be proxied by the differential between foreign and domestic rates of interest (Demetriades and Devereux, 1992). A large differential encourages an individual to engage in capital flight. The larger the differential the more financially repressed is the economy and the greater would be the reduction in savings, as the opportunity cost of holding domestic savings increases as the differential becomes larger. Resources are subsequently withdrawn from the economy and assuming potential savers and savers indulge in this activity, domestic savings suffer.

In many developing countries this is illegal, but the potential profits are so lucrative that it outweighs the risk of being caught. An interesting point to note is that often, the individuals who engage in this act are those holding high position in the government or others who have strong contacts and relationships with the key decision-making persons. This group of individuals are consequently outside the reach of the law and are seldom prosecuted. Alternatively a smaller differential between domestic and foreign interest rate provides less incentive for capital flight (moreso that it is an illegal act) and resources are kept within the confines of the domestic economy. The latter may not always be true. For example, if there is evidence of fickleness in the movement of interest rate, asset-holders may not be confident even if there is a rise in domestic rates. Consequently there is no increase in the mobilisation of domestic savings. Not only is economic stability a concern but political stability is also important. In Trinidad and Tobago there is an element of political instability stemming from the Black-Power movement in the early seventies and more recently the coup d'état of 1990.

In attempting to boost domestic savings, investment and its foreign reserves position the government of Trinidad and Tobago are allowing individuals to open foreign currency accounts in national banks. Additionally an amnesty is given to persons who agree to accept this offer. Thus, parties who have participated in the illegal activity are protected against punishment for holding illegal accounts in foreign institutions. It is not certain how much success this venture will achieve. The little evidence thus far suggests even with a higher level of interest rate and an amnesty there is much hesitancy on the part of individuals to take part in this scheme.

An analogy between the domestic real interest rate variable and the domestic-foreign differential interest rate variable can be recognised. The foreign rate can be seen as the parallel to the rate of inflation since both are deducted from the domestic nominal rate of interest. In this respect, the foreign rate is assumed to correctly reflect price movements and by incorporating it into the model, price movements are taken into consideration.
Also the foreign rate is to be regarded as a desirable level to be attained because it accurately reflects market developments (i.e. supply and demand changes). The foreign-domestic differential interest rate variable may be represented on its own or as a dummy, for example, zero when the differential is small or zero and one when the differential is large, say, more than six percent (Roubini and Sala-i-Martin, 1993).

4.2.6 Overvaluation of the Domestic Country’s Currency

The deviation of the actual exchange rate from a measure of the equilibrium exchange rate provides another proxy for financial repression to the extent that it encapsulates distortion in all prices. This appropriate distortion variable can be perceived as representing the extent to which a country’s currency is overvalued. Agarwala (1983) used a similar definition to measure the impact of price distortion on growth in various economies. If a country’s currency is perceived as being overvalued, a devaluation will be expected by asset-holders, and in order to protect the value of their wealth they seek alternative forms of holding their wealth, since a devaluation ultimately reduces the relative size of an individual’s wealth with respect to foreign assets and or foreign currency.

The more overvalued a currency is, the greater is the desire of the individual to acquire foreign currency and foreign assets since the potential loss of wealth is greater. Assuming that potential savers and savers belong to that group which engage in currency substitution and the illegal purchasing of foreign assets then an overvaluation is associated with lower domestic savings. It is difficult to estimate the capital outflow because of the clandestine nature of the transactions. However, data on United States dollar liabilities of US commercial banks to non-US-residents published by the US Treasury Bulletin provides us with some clues. The liabilities consist mainly of time deposits and are primarily to private individuals and enterprises. This data understates the actual magnitudes of capital flows because of physical assets in the US are not included. Vos (1992) notes that this type of information suffers from three constraints: not all external asset accumulation takes the form of bank deposits; not all funds deposited abroad are registered as some funds are held outside financial centres; and thirdly, international banking statistics collected by institutions do not consist of fully direct data, they may be derived using other data sources. The value of US dollar liabilities for Trinidad and Tobago doubled during the period 1972 to 1973 to $20 million and to $107 million in 1974. By 1979 the value had increased to $518 million, thereafter decline to just over $200 million by the late eighties. Financial repression is exacerbated as a country’s currency becomes more overvalued and the price of foreign exchange becomes further distorted.
Overvaluation and exchange control systems provide the basic conditions for the establishment and growth of a black-market for foreign exchange. A black market in foreign exchange circumvents the legal financial system. It is the consequence of government intervention to restrict trade or capital flows which pushes the restricted users of foreign exchange to find alternative means of carrying out their transactions. The cost of buying foreign exchange in the black market is higher than the official market because of the excess demand that spills over from the official market as well as the risk involved.

Such a market is supplied by unofficial flows of foreign exchange. The demand for these flows emanates out of exchange controls. The greater the premium on foreign currency the more foreign exchange tends to be hoarded and traded outside official channels. Prices become more distorted as the gap between the black-market and the official rate grows and as the controls make it more difficult to supply foreign exchange to the black-market.

The important repercussion of this activity is that resources are diverted away from the official money market and the ability of financial institutions to effectively mobilise savings is reduced. The black-market price for foreign currency can be perceived as an unofficial measure of the equilibrium exchange rate (similar to interest rate equilibrium, where financial repression does not exist). However, Mansur (1991), advises that caution should be exercised since the black-market rate generally reflects the tightness and effectiveness of exchange control and suggests that the equilibrium rate lies somewhere between the official rate and the black-market rate.

Domestic consumption of foreign goods increases as a country's currency becomes more overvalued. This may be due to economic reasons and personal preferences. Savings may decline in the process. The demand can intensify since prices of tradeables may remain constant i.e. an increase in domestic demand for imports does not necessarily induce the exporting country to increase its prices since the proportion of goods demanded by that country may be small. The ability to contain domestic demand is weakened if policies are not reversed, that is, if exchange controls are not imposed or the price of the domestic currency in terms of foreign currency remains the same. In Trinidad and Tobago there were few controls for the seventies and early half of the eighties. The first devaluation that took place during that period was in December 1985 as the signs declining reserves became more apparent. In the latter half of the eighties a negative list (listing of imported goods that were not allowed to enter the country) was imposed. In an attempt to conserve foreign exchange, American
dollars which were normally purchased by all travellers leaving the island irrespective of the destination was curtailed. In the mid eighties it was only sold to persons travelling to countries outside the Caribbean. CARICOM (Caribbean Community) travellers' cheques were supplied to persons travelling within the Caribbean. These are denominated in the currency of the country of origin.

Two measures are used to study the extent to which the Trinidad and Tobago exchange rate is distorted.

(i) The difference between the blackmarket rate and the official exchange rate - the observations of the blackmarket rate have been obtained from newspaper clippings and unpublished sources. Prior to 1970 Trinidad and Tobago had no blackmarket for foreign exchange. In the early seventies the blackmarket emerged. The simultaneous existence of the oil boom, rising demand for imports and foreign travel, falling volume of non-oil exports and eventually oil exports and foreign exchange restrictions stirred the blackmarket into life. The strength of the blackmarket grew as the deviation of the official from the unofficial rate increased. This was exacerbated by the fear of devaluation and actual devaluation and the impositions of stringent import controls.

(ii) Another measure is a definition of exchange rate misalignment (Ghura and Grenes, 1993). This incorporates the real exchange rate (Edwards, 1989). The real exchange rate ($RER$) is defined as:

\[ RER = \frac{E P_I}{P_d} \]  \hspace{1cm} (4.1)

where $E$ is the nominal exchange rate defined as units of domestic currency per unit of foreign currency, $P_I$ is the world price of tradeables and $P_d$ is the domestic price of nontradeables. The wholesale price index proxies for the foreign price level while the domestic price index is the proxy for the domestic price. A rise in a country's $RER$ indicates a real exchange rate depreciation while a decline represents a real exchange rate appreciation and a deterioration of the country's international competitiveness. An exchange rate misalignment ($X\Delta R M$) is defined as

\[ X\Delta R M = \left( \frac{ERER_i}{RER_{\text{eq}} - 1} \right) \]  \hspace{1cm} (4.1)

where $ERER_i$ represents some equilibrium exchange rate for country $i$ at time $t$. This definition affords us some flexibility, Ghura and Grenes (1993) used the average value...
of the three maximum values of \( RER \). In this study the latter is employed as well as the average for the entire period.

An index to represent real exchange rate may also be constructed. Firstly a base year is chosen to represent some equilibrium real exchange rate. The values for the \( RER \) is sensitive to the base year chosen. In this study two base years have been chosen, the first being 1970 because it is assumed that this represent some equilibrium exchange rate since there was no blackmarket rate while the following year marks the birth of a blackmarket rate. The other is 1967. If it is assumed that the an equilibrium exchange rate brings the current account into balance then 1967 is the closest to which the equilibrium was attained since the current account balance was at the lowest for the period under study. The \( RER \) for these years are given a value of one and the values for other years are calculated relative to the base year. Williamson (1993) did a similar analysis. The method involves seeking a period when the exchange rate appears to be at appropriate level and making a "purchasing power parity" comparison in order to identify the nominal exchange rate that would reproduce the \( RER \) for the base year.

4.3 Data Sources
The data for the empirical work was collected from the Handbook of Key Economic Statistics and various issues of the Annual Economic Survey. Both of these statistical bulletins were published by the Central Bank of Trinidad and Tobago. The National Income of Trinidad and Tobago published by the Central Statistical Office as well as various issues of the Review of the Economy compiled by the Ministry of Finance of Trinidad and Tobago were utilised.

The sample period in this study extended from 1960 to 1991 and included only annual observations. The existence of the gross domestic product at market prices and at constant prices made it possible to calculate a gross domestic product deflator. It was then possible to deflate current prices to give corresponding constant prices. There were different base years for the constant prices of gross domestic product. Until 1987 the base year for gross domestic product at constant prices was 1970 thereafter it was 1985. In order to achieve continuity and accurate movement of the constant prices the latter values were rebased to 1970.

In addition to the real values other variables were generated. Money was broadly defined to include currency, time, saving and demand deposits. National savings formed the balancing item on the income and outlay account after all current receipts
and disbursements had been accounted for, that is, it was that part of gross national disposable income which was not absorbed by final consumption. Financial saving was defined as the change in the stock of broad money. Physical saving or saving in fixed assets, for example, land, house and other durables was calculated as the difference between financial saving and national saving. Private savings was defined as the difference between total private disposable income and total private consumption expenditure. Government saving was also calculated as a residual (i.e. the difference between private saving and national saving). Foreign savings represented funds that had been deposited in financial institutions or directly to persons in Trinidad and Tobago from foreign sources. This may take the form of international aid and remittances from abroad. An example of the latter may be incomes from individuals abroad who support relatives in Trinidad and Tobago. It is assumed that investment over and above domestic saving has its source in foreign saving. Consequently foreign saving was defined as the difference between gross capital formation and domestic saving.

The weighted saving deposit rate is published by the Central Bank of Trinidad and Tobago. It covers all deposits and represents the sum of the multiple of rates reported and their respective deposit balances outstanding, divided by the total deposit balances outstanding. The inflation rate was calculated from the retail price index of all commodities. The inflation rate was deducted from the nominal interest rates to give ex-post real interest rates.

The various saving variables have been expressed as a ratio of gross domestic product at market prices. If these ratios were to be expressed in real terms it would reduce to a ratio of the nominal values i.e. the real saving to real income ratio is equivalent to the nominal saving to nominal gross domestic product ratio, because the deflator would be common to both numerator and denominator.

Until the mid-eighties the data compiled by the central bank and the statistical office coincided. Thereafter some discrepancies became apparent. Even within different publications by each institutions, there were discrepancies, for example, in the Handbook of Key Economic Statistics (1960-1987) savings is defined as the difference between disposable income and consumption, while in the Annual Economic Survey of subsequent years it is defined as a residual of gross national product at market prices after deducting total final consumption expenditure and net transfers from abroad. The former definition is maintained by the statistical office throughout the entire sample period. Even when this definition (difference between disposable income and
consumption) is used to calculate saving using central bank data sources the results did not coincide with those of the statistical office for the period after the mid eighties.

The National Income Statistics were published in two separate volumes by the Statistical Office, within which there were overlapping years. Again there were discrepancies for these years, which cannot be attributed to definition changes because definitions for those variables concerned underwent no changes. The discrepancies for some variables, such as national and private saving, and gross capital formation have been fairly obvious, unlike the aggregated variables, say, gross domestic product. As a result of these problems there were two data series for some variables.

Monetary sector data have only been published in the Handbook of Key Economic Statistics by the Central Bank and consequently there were no conflicting data among institutions. These data included the interest rates, broad money and its various components.

There are at least thirty-one data points. This is especially relevant since cointegration analysis is employed and unit root tests are carried out on each variable. Although it may be claimed that it is too short a period to draw valid conclusions and make inferences the data set covers a period of thirty calendar years which is more important than the frequency of the data set in this context.

4.4 The Methodology
The first stage of the empirical analysis involves unit root testing. Based on these results the cointegrating vector is estimated followed by the error correction model. The purpose of this is to reveal whether the series has a unit root and hence non-stationary, or whether it is stationary. A series is stationary if its mean, variance and autocovariances are constant over time.

1 Letters have been sent to the Central Bank and Central Statistical Office in Trinidad and Tobago, however to this date there have been no replies.

2 Formally stated a stochastic process $Y_t$ is stationary if the following conditions are satisfied: the mean of the series defined as

$$E(Y_t) = \mu_Y$$

must be stationary so that $E(Y_t) = E(Y_{t+m})$ for any $t$ and $m$; the variance of the series

$$E[(Y_t - \mu_Y)^2] = \sigma_Y^2$$
order differencing to achieve stationarity it is said to be integrated of order one and denoted as \(I(1)\), if the series is stationary it is integrated to the order zero, \(I(0)\). A series that is defined as an \(I(n)\) requires \(n\)th order differencing to become stationary.

The empirical investigation utilises the Engle-Granger (1987) two-step method. This method was chosen over the standard econometric methodology, because statistical inferences of the former is only valid if all the variables are stationary. In reality, though most economic time series are not stationary and consequently these models are misspecified. Ordinary Least Squares estimation of a model where the variables are integrated of different orders results in a third series that is integrated to the same order as the series with the highest order of integration, unless, of course, the higher order variables cointegrate. For example, applying OLS to a model with only \(I(1)\) variables produces an error term which will generally be \(I(1)\). If this happens the error term is no longer a white noise process and lacks a zero mean and constant variance. This is a violation of the assumptions of the classical linear model and consequently statistical inferences are no longer valid. In the long run the relevant variables will drift apart. This illustrates the necessity and importance of testing for unit roots in the preliminary stages.

Use of the cointegration analysis overcomes these obstacles and allows the specification of an equation in which all the terms are stationary thus allowing the use of classical statistical inference. At the same time information can be retained about the long-run relationship between the levels of the variables. The latter is captured in a cointegrating vector which comprise the parameters of the long-run equilibrium relationship and corresponds to the parameter on the lagged residuals of the error correction representation.

\[
 must be stationary so that \(E[(Y_t - \mu_y)^2] = E[(Y_{t+m} - \mu_y)^2] \); and finally for any lag \(k\) the covariance of the series
\[
 Y_k = \text{Cov}(y_t, y_{t+k}) = E[(y_t - \mu_y)(y_{t+k} - \mu_y)]
\]

must be stationary, so that \(\text{Cov}(y_t, y_{t+k}) = \text{Cov}(y_{t+m}, y_{t+m+k})\).

This represents the weak definition and is employed for practical purposes because of the restricted nature of the strict definition. A series is said to be "strictly" stationary if its probability distribution remains constant overtime:
\[
P(X_t, \ldots, X_{t+k}) = P(X_{t+m}, \ldots, X_{t+m+k})
\]

The strict sense stationarity implies the weak sense, but the converse is not necessarily true.
In testing for the presence of unit roots the Phillips-Perron (1988) tests were employed rather than the basic Dickey-Fuller (1979) and Augmented Dickey Fuller testing procedure. One problem associated with the Dickey-Fuller test is that the estimated residuals are not free of autocorrelation and subsequently the power of the test is reduced. Using the Augmented Dickey Fuller overcomes the problem of autocorrelation, however, the adjustment process suggested by the Augmented Dickey Fuller statistic involves the addition of dependent lagged variables and as result degrees of freedom are sacrificed and consequently contribute to a reduction in the power of the test. This loss can be exacerbated if the disturbances are heterogeneously distributed.

The Phillips-Perron test is therefore regarded as superior. Phillips and Perron (1988) suggested a statistic which incorporates non-parametric adjustments to the Dickey-Fuller "type" statistics. This is likely to raise the power of the test in these circumstances.

Consider the basic model

\[ Y_t = \beta Y_{t-1} + e_t \]

the series \( Y_t \) is stationary if \(|\beta| < 1\) and nonstationary if \(|\beta| = 1\). It can be shown that the variance of \( Y_t \) is increasing if the error term has a constant variance (as assumed in standard econometric theory). Hence the assumptions underlying the standard t-tests for least squares are not valid. What is necessary is some reparameterisation to eliminate the increasing variance. Subtracting \( Y_{t-1} \) from both sides of gives the following:

\[ \Delta Y_t = (\beta - 1)Y_{t-1} + e_t \]

\[ \Delta Y_t = a_1 Y_{t-1} + e_t \]

where \( a_1 = \beta - 1 \)

A null hypothesis of \( Y_t \) is nonstationary i.e. \(|\beta| = 1 \) translates into \(|a_1| = 0 \). If we are able to accept that \(|a_1| = 0 \) then \( \Delta Y_t \) is stationary and \( Y_t \) is integrated of order 1. The original autoregressive model can also incorporate a drift or a drift and trend variable:

\[ Y_t = a_0 + \beta Y_{t-1} + e_t \]

\[ Y_t = a_0 + \beta Y_{t-1} + a_2 T + e_t \]

which in turn can be reparameterised as above so as to allow legitimate testing for unit roots:

\[ \Delta Y_t = a_0 + a_1 Y_{t-1} + e_t \]

\[ \Delta Y_t = a_0 + a_1 Y_{t-1} + a_2 T + e_t \]
In the original model the mean of the series is zero, when the drift is included the mean becomes non-zero and has a time trend when the trend variable is included.

The Augmented-Dickey-Fuller tests simply involves the addition of lagged dependent variables to the model above. The number being determined by the minimum amount of lags to give autocorrelation-free residuals. To circumvent the potential loss in efficiency the Phillips-Perron testing procedure modify the test statistic by employing a non-parametric adjustment for serial correlation. The critical values employed in the Phillips-Perron tests are the same as those used in the Dickey-Fuller 'type' tests (Dickey and Fuller, 1979). In this study the latter method is employed because of the aforementioned advantages. Unit root tests can be applied to a random walk process, random walk with drift, and a random walk with drift and a linear deterministic trend. The testing undertaken in this research examines all possible models. The following models will be used to test for the presence of unit roots:

\[ \Delta Y_t = a_0 + a_1 Y_{t-1} + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \epsilon_t \]

\[ \Delta Y_t = a_0 + a_1 Y_{t-1} + a_2 T + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \epsilon_t \]

With respect to the first model the tests are as follows:
(i) Null hypothesis: \( a_1 = 0 \) - random walk with drift
(ii) Null hypothesis: \( a_1 = a_0 = 0 \) - random walk process

With respect to the second model:
(i) Null hypothesis: \( a_1 = 0 \) - random walk with drift and a deterministic trend
(ii) Null hypothesis: \( a_1 = a_2 = 0 \) - random walk with drift
(iii) Null hypothesis: \( a_1 = a_2 = a_0 = 0 \) - random walk with zero drift

Test (i) for both models is given by a 't' ratio. Critical values are in Table 8.5.2 (Fuller, 1976). The null hypothesis of a unit root is accepted if the t statistic exceeds the tabulated critical value. Tests (ii) in both models and (iii) is given by an F statistic, critical values can be found in Dickey and Fuller (1981). The null hypothesis cannot be rejected if the calculated value is smaller than the critical value. It should be noted that test (i) in model two is conditional upon \( a_2 \) being zero.

Results are presented in Tables 4.2 to 4.6. The variable name is presented in the first column. Level indicates the result of the unit root test when it is performed on the level
form of the variable. First differencing indicates the result of the unit root test when it is performed on the first difference of the variable. The critical value is presented in the next column followed by the order of integration of each of the series based on the tests.
Table 4.2

Phillips-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Differencing</th>
<th>Critical Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
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<td>-1.3911</td>
<td>-2.8755</td>
<td>-2.93</td>
<td>I(2)</td>
</tr>
<tr>
<td>S/Y</td>
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<td>I(1)</td>
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<td>YP</td>
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<td>-2.93</td>
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</tr>
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<td>I(1)</td>
</tr>
<tr>
<td>FS</td>
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<td>-5.4025</td>
<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
<td>FSY</td>
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<td>-5.037</td>
<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
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<td>-2.93</td>
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<tr>
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<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
<td>CP</td>
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<td>-2.93</td>
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</tr>
<tr>
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<tr>
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<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
<td>INF</td>
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<td>-5.0326</td>
<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
<td>XD</td>
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<td>-5.8568</td>
<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
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<td>-5.0326</td>
<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
<td>GD</td>
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<td>-4.0341</td>
<td>-2.93</td>
<td>I(1)</td>
</tr>
<tr>
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<tr>
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<tr>
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</tbody>
</table>

MODEL: $\Delta Y_t = a_0 + a_1 Y_{t-1} + \sum_{i=1}^{n} \beta_i \Delta Y_{t-1} + \epsilon_t$

Null hypothesis: $a_1 = 0$ accept a unit root
### Table 4.3

Phillips-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Differencing</th>
<th>Critical Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4.86</td>
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</tr>
<tr>
<td>YP</td>
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</tr>
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<td>I(1)</td>
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<td>FS</td>
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</tr>
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</table>

MODEL: $\Delta Y_t = a_0 + a_1 Y_{t-1} + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \varepsilon_t$

Null hypothesis: $a_1 = a_0 = 0$; accept a unit root

77
Table 4.4

Phillips-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Differencing</th>
<th>Critical Value</th>
<th>Result</th>
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</thead>
<tbody>
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MODEL: $\Delta Y_t = a_0 + a_1 Y_{t-1} + a_2 T + \sum_{i=1}^n \beta_i \Delta Y_{t-i} + \epsilon_t$

Null hypothesis: $a_1 = 0$: accept a unit root
Table 4.5

Phillips-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Differencing</th>
<th>Critical Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>RY</td>
<td>1.1579</td>
<td>4.2025</td>
<td>6.73</td>
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<td>S/Y</td>
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<tr>
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</table>

MODEL: $\Delta Y_t = a_0 + a_1 Y_{t-1} + a_2 T + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \epsilon_t$

Null hypothesis $a_1 = a_2 = 0$: accept a unit root
Table 4.6

Phillips-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Differencing</th>
<th>Critical Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
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<td>I(1)</td>
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</table>

MODEL: \( \Delta Y_t = a_0 + a_1 Y_{t-1} + a_2 T + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \varepsilon_t \)

Null hypothesis: \( a_1 = a_2 = a_0 = 0 \) accept a unit root
Based on the results of these tests it is apparent that only the real income variable is integrated of order two, it must be differenced once to become an $I(1)$ variable. All other variables are integrated of order one and must be differenced once to achieve stationarity.

Assuming that all the variables in the model are integrated of the same order, say, $I(1)$ the next step involves the testing for cointegration. That is, a long run cointegrating regression can be estimated. This is the first step in the Engle-Granger two-step method. The fitted residuals from the long run regression are then retrieved. If the residuals exhibit stationarity, then the variables that comprise the model are said to be cointegrated and the estimated regression is satisfactory. Informal autocorrelation tests, the Durbin Watson test and Dickey-Fuller type tests may be utilised to check that the residual obtained are stationary. The Phillips test on the residuals of the cointegrating regression will be calculated in this study. Because the estimators of the standard errors are biased no importance is attached to the standard statistical on $R^2$ or ' $t$ ' values of the estimated coefficients. Conditional upon finding cointegration the estimates of the long run equilibrium parameters are consistent and highly efficient. The sample period under question in this study is small and hence caution should be taken in the interpretation of the results as well as in the postulating of statistical inferences.

Upon obtaining a stationary residual from the cointegrating regression an error-correction dynamic equation is estimated. Engle and Granger (1987) have demonstrated that once the cointegrating vector has been estimated using OLS, the parameters of the error correction may be consistently estimated by including the

---

3 Suppose $S_t$ and $Y_t$ are each $I(1)$, we can estimate a long run regression $S_t = aY_t + u_t$. If $(S_t - aY_t)$ is $I(0)$, then $(1,-a)$ is the cointegrating vector and

\[
\begin{bmatrix}
S_t \\
Y_t
\end{bmatrix} \sim CI(1,0)
\]

---

4 The test for stationarity of the residual follows the standard testing for unit roots:

\[
\Delta e_t = \alpha e_{t-1} + e_t,
\]

where $e_t$ is the residual. The null hypothesis is $\alpha = 0$. If the null is accepted the residual is non-stationary and variables in the long run model are not cointegrated. In order to reject the null the value of the calculated $t$ statistic must negative and exceed the critical value in absolute terms. (see MacKinnon, 1991).
residual from the first stage regression in the second stage regression. Thus, only stationary variables are included together with the lagged residual from the cointegrating model. One condition for a satisfactory error-correction model is that the coefficient of the latter must be negative and significant. Additionally they showed that the OLS standard errors in the short run model are consistent estimates of the true standard errors.

In context of the savings model to be estimated a negative lagged residual with a coefficient less than one in the short run model implies any holdings above its desired level will lead to a reduction in its accumulation in the following period. If we consider an individual who aims to save a fixed amount within a specified period, its relevance can be easily appreciated. Governments dominate the savings process in most developing countries, they also have in their development plans the achievement of a fixed growth rate to be attained by a certain time. Having a fixed growth rate warrants a fixed saving rate over the relevant period. If in any one period savings are above that required level then in the following period savings may decline by the proportion it was above its desired level in the previous year. This is given to us by the coefficient of the lagged residual term.

The Engle-Granger two-step method provides a complete model by incorporating the long run static and the short run dynamic model. One advantage of this approach is that the two steps are quite separate and consequently changes in the dynamic model do not necessitate re-estimation of the static model obtained in the first stage. It is recognised that there is a problem of uniqueness with the Engle-Granger (EG) method when there are more than two variables. That is, there might be more than one cointegrating vector. The Johansen (1988) method of estimation avoids this problem, it allows determination of the maximum number of cointegrating vectors and obtain maximum likelihood estimates of the cointegrating vector. This method, however has not been employed simply because there are only thirty data points and consequently the results would have to be treated with more scepticism than in the E-G method. Another complication that is avoided by the E-G method is that unlike the Johansen method it only gives one cointegrating vector.

\[ \Delta S_t = b\Delta Y_t + \lambda(S - aY)_{t-1} + v_t. \]

where \((S_t - aY_t)\) represents the error term from the cointegrating regression.

\[ 0 > \lambda > -1 \]
The dynamic model must meet other requirements in addition to negatively signed residual coefficient in order to be satisfactory. Tests for serial correlation, specification error, normality, heteroskedasticity and structural breaks will be carried out. The Godfrey (1978) test of residual serial correlation is adopted. The misspecification test is Ramsey's (1969) regression specification error test (RESET) of functional form. Testing for normality of the regression residual involve the Bera-Jarque (1981) procedure. In testing for heteroskedasticity, Engle's (1982) Autoregressive Conditional Heteroskedasticity test of residual will be calculated. Lastly, Chow (1960) test for structural break will also be carried out.
CHAPTER FIVE

Financial Repression and the Saving Rate

5.1 Introduction

Financial repression as expounded by McKinnon and Shaw has a vital impact on the saving process and through it on the rate of growth of output. Low levels of economic growth are explained mainly in terms of a shortage in capital. The latter, in turn is explained mainly by poverty and the small or limited capacity to save. In other words, economic expansion appears to be regulated by the availability of savings.

An application of the traditional theories to understanding saving patterns in developing countries may be misleading because they were formulated for developed countries with built-in assumptions applicable to these type of economies. The peculiarity of the financial sector in developing countries is marked by its dualism, both old and modern lending and deposit system exist side by side. Hence it would be erroneous to apply models grounded in Classical-Neoclassical or Keynesian theories. It was along a similar line of thought that McKinnon and Shaw came up with the theory of financial repression, despite the fact that their policy implications were similar to the Classical-Neoclassical theories. While the Keynesian theory was regarded as being short term the Classical-Neoclassical was faulted in its assumption that a competitive relationship existed between money balances and capital accumulation.

Aghevli et al (1990) in a study of the role of savings claimed that the national savings rate of developing countries fell from 27 percent in 1978-81 to 22.5 percent in 1982-88. This overall figure, however, conceals the diversities among countries. In light of the importance of savings, its recent declining trend and the nature of developing countries it is worthwhile to explore the nature of the savings function, the impact of financial repression on saving habits in Trinidad and Tobago and the potential merit of liberalisation policies in this context.

In the following sections a savings model is specified together with a discussion on the relevant explanatory variables. The model is then estimated using both the cointegration and standard econometric technique while varying the measurement of financial repression. This is followed by an analysis of the results and policy implications. Summary Tables of the empirical are presented in the conclusion.
5.2 The Savings Model

The general savings-rate function for the Trinidad and Tobago economy is specified as:

\[
\frac{S}{Y} = f(Y_G, FR, FS)
\]

(5.1)

\[
\frac{\partial S/Y}{\partial Y_G} > 0; \frac{\partial S/Y}{\partial FR} < 0; \frac{\partial S/Y}{\partial FS} > 0
\]

where \( S \) is a measure nominal aggregate savings, \( Y \) is nominal income, \( Y_G \) is real income growth, and \( FS \) is real foreign saving. Similar models have been specified and estimated by Fry (1978), Giovannini (1983), Gupta (1987) Aghevli (1991) and Warman and Thirlwall (1994). Aggregate savings incorporate both government and private savings. The GDP deflator is utilised to calculate real savings. Growth in real savings rather than nominal savings is the key to economic growth. In light of this it is important to become aware of the various factors that affect the real saving. Assume, for example, that current savings remains constant over consecutive years, for simplicity. While the cost of undertaking investment does not, that is, the cost of obtaining capital equipment, rent and labour do not. Under these circumstances (with the present level of savings that has been accumulated) it would be impossible to increase investment and hence positively influence growth through this medium. Even if current savings were to grow overtime real savings may or may not increase depending on the level of inflation and consequently there may not be additional funds forthcoming for investment.

The saving rate is incorporated as the dependent variable rather than the level of savings for two reasons. Firstly, it may be argued that government policies should be aimed at increasing the proportion of saving out of income and not just the level of saving (i.e. it is more important that policies be geared towards increasing the saving ratio). A rise in the saving level may not necessarily indicate an increase in the saving rate. It may simply reflect a rise in income. In this scenario, assuming that the rise in saving is not equivalent to the rise in income then consumption also increases. The marginal propensity to save and consume may remain constant, or indeed, if saving increases, but at a smaller rate than consumption, then the marginal propensity to save falls. A rise in the saving ratio implies that the average propensity to save has increased overtime and consequently the average propensity to consume decline.

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1 see Chapter Three for a detailed discussion.
Secondly, if the level of savings is used as the dependent variable the influence of income variable may have a tendency to dominate the model. Incorporating the income variable on the left hand side may neutralise this effect to some extent. This is especially important in the Trinidad and Tobago scenario because of the transient nature of income earned during the oil boom of 1974-81. Income increased dramatically only because of windfall profits as oil prices increased. Had it not been for oil receipts the rate of increase in income would have been at a slower rate. Between the year 1972 to 1974 (only one year into the oil boom) gross domestic product almost doubled. The likely impact in the estimation on a saving model would be a domination of the income variable.

One of the main interests in this research is the impact of financial repression on aggregate saving. Although the level of aggregation is fairly high it has the advantage of enabling us to focus on the main issues. This focus is especially appropriate since from the viewpoint of overall economic development it is the behaviour of aggregate savings which is the most important. In developing countries, more so, aggregated data is more accurate and accessible than the estimates of components. In the case of Trinidad and Tobago this is particularly true, simply because it is only within the last decade that there been a great desire and attempt to widen the data collection process, and hence an effort is being made to collect disaggregated data. Before this period, therefore proxies must be used to estimate disaggregated variables.

In an attempt to discriminate between different types of savings, aggregate real savings will be broken down into its components. Financial savings will be distinguished from savings in physical assets where financial savings represents the demand for real money assets and is defined as the change in the stock of money. Savings in physical assets may assume the form of land or gold, and is calculated as a residual. Financial savings represents the funds that are mobilised by the financial intermediaries, for example, time and saving deposits. Funds in this form represent potential resources that are made available to the investment process, hence it is important to examine the influence of the interest rate. It is expected that the coefficient of the interest rate variable in the aggregate savings model will be smaller than its counterpart in the model of financial savings. Consequently it is important to distinguish between the components because they may respond differently to interest rate movements.

It is conceivable that changes in interest rate affect both financial and non-financial saving (saving in the form of physical assets-real saving) quite differently and when these components are aggregated the effects may neutralise each other. For example, a rise in the interest rate may increase financial savings and decrease non-financial
savings through two channels. Firstly, at each income level for the higher interest rate there is a rise in level of financial savings and a fall in the amount that is saved in the form of non-financial assets. Secondly, asset holders may reduce their existing stock of non financial savings in order that they may increase their financial savings and earn more interest income.

At an aggregated level there may not be any noticeable change in the level of saving because the impact on the components of savings offset each other. It may then be inaccurate to conclude that an attempt to mobilise additional funds for investment via manipulation of the interest rate is unsuccessful. From the aggregate savings perspective this is true, but the key to harnessing economic growth is not simply an increase in saving, rather an increase in savings accompanied by an increase in the resources that are available to be used by investors in the investment process.

A similar analysis can be made with respect to the distinction between private and government saving. Private savings may be more responsive to movements in the interest rates unlike government saving, hence use of total saving may obscure any responsiveness to changes in the interest rate. The obligation of an individual or a private firm is to themselves and logically the profit motive will override all other motives. Consequently any avenues through which additional income can be earned will be taken. The role of the government makes it impossible to operate in this manner. It is unlikely that government expenditure suffers and savings enhanced at all instances because there are favourable movements in the interest rate.

Furthermore, government savings in developing countries has a tendency to far outweigh private savings. Thus if a rise in the interest rate increases private savings it would probably be shown to be significant when the latter is included as the dependent variables. If on the other hand government savings was the relevant dependent variable, the coefficient might be negligible or insignificant. This is because private savings is a small proportion of aggregate savings. When it is lumped together with government savings, the strength of any increases in private savings are reduced. In light of this an attempt will be made to estimate savings in a disaggregated manner since an estimation of aggregated saving may yield misleading results.

2 While the ratio of private savings to income \( PS/Y \) can be allowed as an explanatory variable within the confines of the cointegration methodology, financial savings cannot be allowed. This is because financial savings has been defined as the change in money stock. Based on the unit root test the latter was found to be integrated of order one. Since financial savings is the change in money then by definition it is stationary or integrated of order zero. This result was confirmed when a unit root test was performed.
5.3 Measuring the Variables

5.3.1 Income

Income is regarded by many economists as the most important determinant of savings, especially in developing countries. It is expected that savings, however defined, is positively related to income. However there are many definitions of income. In Keynesian economics, the level of current income is the important variable. While the Ezekiel-Mack model advanced that current income leaves the picture incomplete. They felt that the direction of income change offered a better explanation of savings. Some also argued that by virtue of habit and thrift, individuals are slow to increase their consumption as income increases. That is, the proportion of saving out of income increases as income increases. Friedman (1957) distinguished between permanent and transitory income. The former is not subject to short run fluctuations and what is spent or saved is determined by reference to their permanent income. Any unexpected increase in income is treated as transitory and saved. Houthakker and Taylor (1966) demonstrated that lagged variables exerted an important influence on consumer behaviour. Habits become impressed on the human system and are maintained.

Disposable income may be preferred, rather than the aggregated income figure which incorporates the taxes because saving is an immediate component of disposable income. It may respond to changes in disposable income and may not always respond to changes in aggregate income. This however is rather extreme because it hinges on the underlying assumption that a change income, say a rise, is followed by an almost exact change in taxes that are to be extracted from individuals whose incomes have increased.

Oil dominates the economy of Trinidad and Tobago and is therefore the main income earner. It accounts for approximately 70 percent of exports. In fact over the decade 1974 to 1985 its contribution to total exports average 79 percent. An examination of the pattern of saving shows a there is a threefold increase from 1973 to 1974. This increasing trend continued until 1982. Thereafter it declined reaching a negative level in 1986. The highs and lows in the Trinidad and Tobago economy follow the highs and lows of oil prices. The hikes in the oil prices of the seventies and early eighties (and hence export receipts and foreign reserves) had a definite and obvious impact on the economy. In the Trinidad and Tobago context it can be questioned that saving respond more to income from oil exports rather than the interest rate especially when one considers that there is evidence of increasing saving despite negative real interest rates. In light of this oil revenues may have be important in boosting saving level in Trinidad and Tobago.
The earnings from oil receipts are purely transitory in the sense that although oil dominates the economy it was just a windfall gain experienced by an economy for a limited period, rather than something that policy-makers can have total faith to bring in export receipts and income of such high proportions at all times. The high levels of saving recorded during the period can be attributed to the oil windfalls and cannot be seen as a permanent factor in the economy of Trinidad and Tobago. If this is so then in modelling the economy income should be separated into permanent and transitory components, rather than lumping them together to give an inaccurate picture or the savings model. In other words if saving is modelled without realising the importance of the transitory component of income, savings, investment and growth rates in subsequent years may be disastrously overestimated with implications for the economy as a whole. Thus it may be wise for policy-makers to discriminate between these components of income. By following the latter there is a greater chance that economic plans and forecasts can be maintained, because the uncertainty and volatile components are been taken into consideration.

The relevant income variable which is included in the savings model is real income growth $YG$ or real per capita income $YP$. The calculation of permanent and transitory income would require a considerable volume of data. Our small data set makes this a difficult task. Furthermore, the entire income earned from oil cannot be treated as transitory since there is some portion which should be regarded as permanent. This distinction necessitates assumptions which might not be valid especially when the limitation of the data is considered.

5.3.2 Foreign Savings

Foreign saving ($FS$) may augment domestic saving (Chenery and Strout, 1966) and contribute towards investment or may function as a substitute to domestic saving (Weisskopf, 1972). In the 1950s and 1960s the former view was accepted. Early models perceive foreign savings as having two effects: relaxing the saving constraint immediately by increasing the level of investment directly, and secondly by increasing the rate of capital accumulation indirectly by raising the level of income and the rate of internal savings. In the basic model, growth is assumed to be constrained by savings which are already at their maximum level. In light of this, the role of foreign assistance is to ease the savings constraint by providing investible resources to supplement

---

3 Real income as a level variable could not be employed because it was integrated of order two while all other variables were integrated of order one. Inclusion of this variable would have resulted in invalid estimates.
efforts. It is further assumed that the recipient country would not want to increase aid merely to increase consumption and that governments in the countries concerned would have no incentive to reduce domestic savings. The assumptions made here amounts to saying that all foreign assistance is invested, this leads not only to a higher rate of capital accumulation, but also to a larger proportion of income being saved.

Papanek (1972) elaborated on this notion claiming that whether savings increased depended on the importance of foreign exchange in the investment process. If investment is a function of the availability of foreign exchange to import capital and intermediary goods to maintain already installed capacity then it would increase with savings and raise income and domestic savings. Furthermore if savings was a function of exports of industrialists then foreign inflows would raise savings by increasing the income of these groups.

However by the early seventies this complementary role was being criticised. Foreign savings represented an addition to the total supply of resources available to that country and consequently increased the possible magnitudes of domestic expenditure. Any utility function balancing the immediate efforts to be derived from current consumption and the possible future benefits to be earned from postponing current consumption in favour of future consumption would lead to a marginal allocation partly to consumption and partly to investment. However to the extent that individuals in the private or public sector wish to use the additional external resources to increase consumption there will be a decline in intended domestic savings since domestic income remains unchanged.

Griffin and Enos (1970) described the assumptions of the Chenery-Strout model as "odd". One of the reasons for this claim is that the latter makes domestic savings dependent on national income indicators rather than total resources available in the economy. As long as the cost of the foreign capital inflow is less than the incremental output ratio it will be beneficial for that country to borrow as much as possible and substitute foreign for domestic savings. This substitution role can be better appreciated if we assume that aggregate savings are substantially determined by government policy and that they pursue a fixed growth rate as their objective. The achievement of this growth rate necessitates a given investment and saving rate. Consequently if foreign resources are made available there is the possibility that the government will change its policies and reduce government savings by an equivalent amount so as to just attain the required growth rate. In other words given a target growth rate in a developing country foreign assistance will permit higher consumption and domestic savings will simply be a residual; that is, the difference between desired investment and the amount of foreign
aid available. This suggests that foreign saving has a negative impact on aggregate saving and government saving and illustrates the need to separate private and public investment.

In particular, governments finding resources abroad may refrain from raising taxes. In this sense it becomes a substitute for tax reforms. In some developing countries with low levels of income and small or negative growth rates foreign savings or any foreign aid for that matter is directed into consumption to alleviate the poverty situation. Consequently very little of foreign resources finds its way in productive investment.

Foreign savings as shown discussed substitutes for domestic saving if savings are largely determined by the government. The same may also be true for private saving in the sense that foreign assistance can be responsible for low personal savings by households and negligible or even negative savings by business out of retained profits. If these are the responses of the private and public sector to foreign inflows the impact will be a decline in aggregate domestic savings. Even if households and private firms ensure that foreign assistance augment its savings, it may not be reflected in an aggregate saving function because in developing countries there is a tendency for government saving to outweigh private saving and hence dominate the saving function.4

5.3.3 Dependency Ratio
A dependency indicator $DR$ is also included in the analysis of savings rates. It has been suggested that birth rates should be inversely related with a country's saving potential. According to the theory a prolonged high birth rate will affect a population's age composition, placing a relatively large percentage of the population in the younger age brackets. A population with high birth rate may have 55-60 percent of its population within the ages 15 to 65, whereas a low birth rate may have 65-70 percent of its population in the more productive age group. The impact of additional children has an incremental claim on consumption and, ceteris paribus savings declines as the claim is being financed. This relationship has been borne out of demographic experience. Children constitute a heavy claim on expenditure which in the national income accounting framework is included in the consumption category. They contribute to

---

4 Foreign saving is defined as the difference between gross capital formation and national saving. It may be seen as exogenous variable since injections to the economy in the form of aid, loans, remittances from abroad and other similar contributions are independent. It is represented on its own or as a ratio ($FSY$).
consumption and not to production and hence a high ratio of dependants to the working age population might logically be expected to impose a constraint on the society's potential for savings. If there are no compensating increases in the income of adults or decreases in their consumption then the overall effect will be a reduction in aggregate savings.

The consumption of dependants comes out of three sources private household savings, the public sector's surplus, on the current account and corporate savings. With respect to government surplus the link can be perceived from two perspectives. Firstly, if it is assumed that taxation is levied out of discretionary expenditure, which is defined as the surplus above a minimum per capita income, then taxation revenues would be lower since the additional expenditure burden imposed by increased dependants reduces the surplus. That is an increasing population, ceteris paribus, reduces per capita income and consequently the surplus above the minimum per capita required. Also, a larger population through an increased growth rate places pressures on the government to increase welfare facilities. Government is forced to increase its expenditure on health, education and other social amenities. Higher dependency ratios in terms of individual under the age of fourteen and over sixty-five places a heavy demand on social services, with respect to the former education and medical facilities for the latter. These are sometimes termed as 'unproductive' investment goods, and thus higher dependency ratios may be associated with lower investment in the 'productive' capital.

One might be tempted to think that dependency ratios would not affect corporate savings, but in developing countries where corporate ownership may not be widespread, the boundary between family income and corporate income may not be distinct and thus constraints imposed by the dependants would also affect corporate savings. Another important fact is that in many developing countries corporate savings contributes little to national savings, and consequently there is no link between corporate saving and the dependency ratio. That is if all corporate surplus is saved the effect of dependency on national savings would still be small. The main contributor towards savings in most developing countries is the government. A higher dependency ratio is associated with higher consumption from private and public sector earnings. Based on this a higher dependency ratio is expected to have an inverse relationship with the savings rate.

There is also the view that the impact of children varies with economic development and can even have a positive impact on savings. Children may substitute for other forms of consumption or may be met by a reduction in consumption of goods and services by
other family members and not necessarily a reduction in household savings. They may stimulate parents to work harder, search for information and try new methods, for example, moonlighting is almost entirely explained by financial necessity which is found to be highly correlated with family size. They may contribute directly to household income. In developing countries where there is a large agrarian society, children contribute directly to farm. This contribution can exceed any possible negative impact on family savings.

Dependency ratios may have no influence on saving rates. One of the results for the insignificant relationship in the lower income groups is that demographic factors only become important when per capita income reaches a level where it can provide more than a minimum level of living. Potential savings will then be generated and it is only at this point can dependants actually reduce savings. If the minimum level can not be attained no savings will be generated and thus, there is nothing for additional dependants to reduce. In those developing countries which do no attain that minimum living, the criteria for the generation of savings is not met and as a consequence dependency does not exhibit any significant influence on savings and growth rates.

5.3.4 Other Explanatory Variables
Other explanatory variables are incorporated in the models which attempts to estimate private savings. These include credit to the private sector made by financial institutions (CP), government internal debt (GD), and government savings (GS). Credit to the private sector represent a form of liquidity constraints. If financial institutions are willing to offer credit individuals, rather than drawing down on their own savings, may prefer to access credit from these institutions. As a result individual savings' patterns may proceed unchanged. Consequently a rise in credit to the private sector may be accompanied by no decline in savings level. On the other hand, if credit is offered but the price of it is too high to induce potential investors, then the latter may resort to drawing down their savings. However, the liability must be repaid at a future date. Repayment of this obligation may necessitate the utilisation of accumulated savings. Hence whether or not credit induces savings depends on these conflicting alternatives.

The government sector through the issuance of treasury bills, bonds, printing of currency or other borrowing from the central bank or commercial bank incurs internal debt. Government domestic finance makes great demands on private financial surpluses. Government savings may have an effect similar to a "crowding out" effect. Government can increase its income through direct and indirect taxation. The former reduces disposable income, while the latter may create increases in spending out of
disposable income. Due to one or the other private savings decline, as the government harnesses its savings at the expense of the private sector.

5.4 Empirical Results and Implications for Policy

The results of the Phillips-Perron test are presented in Tables 4.2 to 4.6 in Chapter Four. Real income and financial savings must be excluded from our long run models because they are I(2) and I(0) respectively. Unit root tests on the first difference of all other variables showed that the null hypothesis of I(1) could be rejected. Other than real income and financial savings, all variables appeared to be integrated of order one. This provides the basis for allowing us to estimate the cointegrating regressions whose estimates should subsequently be consistent and efficient.

The results for the various models are presented below. The first regression in each set of results represent the long-run model. All models are estimated in levels. Phillips (PHILLIPS) is the test for the presence of a unit root in the residual of the long-run model. Res(-1) incorporated in the short run models, represents the lagged residual from the long-run regression. All variables in the long-run model are integrated of order one.

This is followed by the short-run regression which only includes stationary variables. In all cases stationary variable are the first differences. $\Delta$ represents the difference operator. Aggregate savings rate models are estimated for each proxy of financial repression, while private savings models are estimated for four of the proxies. 't' statistics are in parenthesis. The diagnostics for the short run model are presented immediately below the 't' statistics. Table 5.1 gives a guide to the abbreviations used.

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5 Financial savings has been defined as the change in real money (RMON). Since RMON is an I(1) variable then its first difference should be I(0).
Table 5.1
A guide to abbreviations for diagnostics

The results for the dummy variables are in section 5.4.2. In the first set of results in this section a dummy of one represents moderately negative rates, while in the latter a dummy of one represents severely negative rates. The cointegration methodology is not applicable to these models, hence there is no distinction between the long and short-run and testing for unit roots (the Phillips' test is not relevant in these model specifications). The estimates were obtained using the standard econometric methodology.

The residuals that have been retrieved from the long-run regressions (in the models below) are stationary as indicated by the Phillips test on the residual. This suggests that the variables incorporated in the model are cointegrated. The error-correction terms (lagged residuals) included in the dynamic specification acts as a measure of disequilibrium between long-run actual and desired values in any period and ensures that the short run dynamic model retains information about the long-run relationship between the variables. These coefficients are significantly negative and and less than zero but greater than minus one in all the models that estimate aggregate savings. In some of the specifications of private savings, the size of the error correction terms are larger than the absolute value of one. However the amount by which they exceed this value was statistically insignificant.
5.4.1 Proxy One: The Real Interest Rate
The first set of results are those for the real interest rate. The estimates for the private savings models follow those for the overall savings rate:

\[
S/Y = 0.3217 + 0.6851YG - 0.0769DR - 0.0031R - 0.5819FSY
\]

\[
\Delta(S/Y) = -0.00238 + 0.2056\Delta YG - 0.0645\Delta DR - 0.0025\Delta R - 0.5898\Delta FSY - 0.5409\Delta RES(-1)
\]

\[
(-0.4563) \quad (1.467) \quad (-1.178) \quad (-1.686) \quad (-7.844) \quad (-3.375)
\]

\[
\text{ADJ } R^2 = 0.804 \quad \text{AR}(1): F(1,25) = 0.692 \quad \text{RESET: } F(1,25) = 0.9032
\]

\[
\text{B-J: } \chi^2 = 2.851 \quad \text{ARCH}(1): F(1,25) = 1.167 \quad \text{CHOW: } F(4,22) = 1.3755
\]

\[
\text{PHILLIPS} = -5.2102
\]

\[
PS/Y = -0.0588 + 0.3174YG - 0.00002CP - 0.2004R - 0.2128GSY
\]

\[
\Delta(PS/Y) = -0.0018 + 0.2093\Delta YG - 0.000116\Delta CP - 0.0054\Delta R - 0.3662\Delta GSY
\]

\[
(-0.2873) \quad (1.360) \quad (-0.8839) \quad (-3.084) \quad (-2.565)
\]

\[-1.0714\Delta RES(-1)
\]

\[
(-5.388)
\]

\[
\text{ADJ } R^2 = 0.531 \quad \text{AR}(1): F(1,25) = 1.42 \quad \text{RESET: } F(1,25) = 1.5102
\]

\[
\text{B-J: } \chi^2 = 1.1992 \quad \text{ARCH}(1): F(1,25) = 2.853 \quad \text{CHOW: } F(4,22) = 1.151
\]

\[
\text{PHILLIPS} = -6.71
\]

Whether the savings ratio (S/Y) or the private saving ratio (PS/Y) is used as the dependent variable there are no changes in any of the directional relationships for Proxy One. The real interest rate exerts a negative influence on the national savings rate in the economy of Trinidad and Tobago. This is in contrast to the orthodox economic theory, but there are extenuating circumstances, in the sense that the real rate of interest has never risen above three percent and certainly not above zero in the last two decades (see Table 4.1). In fact it has been shown that the real rate of interest has been severely negative for some time. This finding also conflicts with the McKinnon-Shaw hypothesis, but perhaps it can be reconciled with their view of the financial repressionists. They argue that a reduction in financial repression is more attractive to asset holders in the sense that the demand for interest earning assets should increase following a rise in the interest rate. Reduction of financial repression in their application refers to the attainment of positive real interest rates and in some cases the attainment of the equilibrium rate which may not be just barely above zero percent.
In the Trinidad and Tobago context the reduction in financial repression that occurred only meant that real interest rates were less negative, not an achievement of positive rates, or even moderately positive real rates. This is true for most of the period under study. Hence the negative response of the saving rate should not be surprising. If, perhaps there were periods within the sample in which the interest rates were not just barely positive then the results might have been different.

The inverse relationship is maintained in the short-run model. Based on tests for serial correlation, heteroskedasticity, normality and misspecification the regressions appear to be diagnostically acceptable. In the estimated short run models the financial repression coefficient is significant. It should be emphasised that the financial system in Trinidad and Tobago is being broadened and deepened, in the sense that the types of financial instruments offered have expanded and the institutions themselves have diversified. There is now a stock exchange in Trinidad and Tobago. There are similar institutions in Jamaica and Barbados and there are plans to foster a communications network so all three stock exchanges can be linked and expand the potential stock exchange market. Perhaps in the future the role of the interest rate may be more important in the accumulation of interest bearing assets. However for the period under study there are no signs of this.

5.4.2 Proxy Two: Dummy Variables

The dummy variable result are as follows:

\[
\begin{align*}
S/Y &= -0.0269 + 0.0013 \Delta YG + 0.00011D1 - 0.00043FS - 0.3662GSY \\
& (-0.6217) (6.192) (0.1526) (-11.114) (-2.565)
\end{align*}
\]

\[
\begin{align*}
\text{ADJ } R^2 &= 0.852 \\
\text{B-J: } \chi^2 &= 0.071 \\
\text{ARCH(1): } F(1,25) &= 2.815 \\
\text{CHOW: } F(4,22) &= 0.130
\end{align*}
\]

\[
\begin{align*}
S/Y &= -0.0375 + 0.00010 \Delta YG - 0.02382D2 - 0.00044FS - 0.3452GSY \\
& (-0.7556) (4.398) (-1.656) (-11.30) (-2.435)
\end{align*}
\]

\[
\begin{align*}
\text{ADJ } R^2 &= 0.865 \\
\text{B-J: } \chi^2 &= 0.4362 \\
\text{ARCH(1): } F(1,25) &= 1.241 \\
\text{CHOW: } F(4,22) &= 0.3956
\end{align*}
\]
Where the dummy is one for moderately negative real interest rates the coefficient is generally positive but insignificant, however in those cases where the dummy is redefined as one for severely negative rates (less than minus six percent) the coefficient becomes negative and in some cases significant. This suggests that while moderately negative real rates do not excessively influence the saving rate, severely negative rates significantly lower the savings rate. This is indicative of a positive potential of lower levels of financial repression with respect to increasing the savings rate.

5.4.3 Proxy Three: Commercial Bank Reserve Requirement

A higher reserve requirement ratio restricts upward movement in the interest rate and serves to discourage savings. Higher ratios reflect financial repression and according to the theory lower reserve ratios are associated with higher savings. This is evidenced in the estimated models:

\[ S/Y = 0.3615 +0.2921YG -0.2009DR -0.00033CR -0.7817FSY \]

\[ \Delta(S/Y) = -0.0027 +0.1301\Delta YG -0.0801\Delta DR -0.0002\Delta CR -0.8026\Delta FSY -0.6480RES(-1) \]

\[ (-0.5535) (1.538) (-1.487) (-0.0141) (-10.03) (-4.33) \]

\[ \text{ADJ } R^2 = 0.79 \quad \text{AR(1): } F(1,25) = 1.006 \quad \text{RESET: } F(1,25) = 0.066 \]

\[ \text{B-J: } \chi^2 = 4.51 \quad \text{ARCH(1): } F(1,25) = 2.294 \quad \text{CHOW: } F(4,22) = 0.263 \]

\[ \text{PHILLIPS} = -4.19 \]

\[ PS/Y = -0.0222 +0.00003YP -0.00006CP -0.00015CR -0.1297FSY \]

\[ \Delta(PS/Y) = -0.00011 +0.00028\Delta YP -0.00001\Delta CP -0.000194\Delta CR -0.3427\Delta FSY \]

\[ (-0.0127) (0.4045) (-0.0063) (-0.8201) (-2.541) \]

\[ -1.122RES(-1) \]

\[ (-4.93) \]

\[ \text{ADJ } R^2 = 0.51 \quad \text{AR(1): } F(1,25) = 0.421 \quad \text{RESET: } F(1,25) = 0.32455 \]

\[ \text{B-J: } \chi^2 = 0.327 \quad \text{ARCH(1): } F(1,25) = 2.923 \quad \text{CHOW: } F(4,22) = 1.36 \]

\[ \text{PHILLIPS} = -5.01 \]
The inverse relationship exists in both long run and short run models (for both private and aggregate savings) but insignificant in the latter and the size of the coefficient is very small in the models. Although these results comply with the financial repression theory they are in conflict with those found earlier. Based on these results the theory of financial repression cannot be rejected but the insignificance of the financial repression variable makes it difficult to accept the theory without some reservations.

5.4.4 Proxy Four: The Rate of Inflation

The results of the models that incorporate inflation as the proxy for financial repression reinforced the findings of proxy one and two. Savings ($S$) is an inverse function of the real interest rate ($R$). The real interest rate is defined as the nominal rate less the rate of inflation ($\pi$). It follows, that a rise in inflation causes a reduction in the real interest rate ($r - \pi$) and consequently $1/R$ increases.

$$S = f\left(\frac{1}{R}\right) = g\left(\frac{1}{r - \pi}\right)$$

(5.2)

The results of the savings models below suggest that there is a direct relationship between inflation and the saving rate. However the coefficients are small and generally statistically insignificant, except in the case of the dynamic private savings equation. Furthermore, it appears that when confronted with rises prices, individuals increase their savings in order maintain their level of real savings and to protect future consumption. This finding is in conflict with the theories of financial repression but confirm the earlier results in the savings model for proxy one.

$$S/Y = 0.3021 0.6839YG -0.0733DR +0.0033INF -0.5799FSY$$

$$\Delta(S/Y) = -0.0024 +0.2188\DeltaYG -0.0062\DeltaDR +0.0024\DeltaINF -0.6939\DeltaFSY$$

\[\text{(-0.4643) (1.508) (-1.127) (1.613) (-7.730)}\]

\[-0.5532RES(-1)\]

\[\text{(-3.48)}\]

$$\text{ADJ } R^2 = 0.801 \quad \text{AR(1): } F(1,25) = 0.639 \quad \text{RESET:} F(1,25) = 0.9354$$

$$\text{B-J: } \chi^2_1 = 2.0967 \quad \text{ARCH(1): } F(1,25) = 2.076 \quad \text{CHOW: } F(4,22) = 0.5997$$

$$\text{PHILLIPS} = -5.23$$
Based on the results of Proxies One and Four the income effect of a fall in the financial repression outweighs the substitution effect. That is, in Trinidad and Tobago a lower degree of financial repression allows the asset holder to obtain a larger interest income and hence reduce the incentive to save out of current income since current consumption can be increased without an erosion of future consumption. Proxies One, Two, Three and Four can be regarded as different forms of representing the real domestic interest rate. Some general comments on the empirical results thus far are necessary.

One possibility for explaining the behaviour between financial repression and the savings rates lies in the definition of the savings variable. Private saving may be a small proportion of aggregated savings, while government savings form the bulk. Because the latter does not respond, or responds negatively to a reduction in financial repression, its influence may swamp the relationship and consequently it appears that lowering financial repression fails to induce higher saving rates. This hypothesis however proves to be incorrect as indicated in the models which incorporated private savings rates as the dependent variable.

Financial repression in the form of negative real rates of interest imply that individuals who invest in interest earning assets will experience a net loss in their wealth. Consequently it will be to their advantage to substitute other assets for the interest earning ones. In Trinidad and Tobago there are two alternatives, the individual might illegally seek to obtain foreign assets or buy fixed assets, for example land. The former outlet for funds is not available to everyone. The Trinidad and Tobago currency is not an international one, and to procure foreign assets, foreign currency must first be obtained. Trinidad has had a quota restrictions on the amount of foreign currency an individual can purchase and even so purchases can only be made with where relevant documents are provided e.g. evidence of a legitimate business or proof of a ticket to a foreign country and relevant travel documents. These conditions and restrictions make
it virtually impossible for an individual to obtain foreign currency and assets and consequently for those individuals there is little choice if they wish to invest in alternative assets.

There may be a preference for fixed assets because it is safer. This is perhaps the notion of the individual who is concerned with earning the most from his current wealth and is knowledgeable of substitution between assets. It should be noted that Trinidad and Tobago is a developing country which has only recently started to expand the range of interest earning assets that is available, similarly the establishment of broker's institutions is almost new. Asset holders who cannot locate foreign outlets for their wealth have access to a very limited range of interest earning assets. They may be forced to leave their wealth in the financial institutions or purchase fixed assets.

Perhaps the contractual component of savings is so large that it dominates the aggregate savings, that is, persons save a fixed amount per period despite changes in the interest rate. The fall in financial repression or rise in interest rate that takes place is just not sufficiently attractive to stimulate additional savings nor can it persuade asset holders to alter their consumption patterns.

The history of the people of Trinidad and Tobago is very pertinent in an understanding of the savings behaviour. Approximately 45 percent of the population is of Indian origin, descendants of the large scale immigration subsequent to the abolition of slavery, about the same proportion is of African origin, descendants of the slave trade. Habits of saving and thrift have been inculcated into their minds not because of the potential income to be earned from the interest, but rather for protection against uncertainties in the future. This attitude still exist more than one-and-a-half centuries after the abolition of slavery and more than half a century after the termination of immigration. The interest rate is a term which may have little or no impact on the lives of the rural population. It can be argued that this attitude is not confined to Trinidad and Tobago but one must admit that the importance of savings for land holding and land holding itself are relatively more important to individuals in this context. There is evidence of wealth, more so in the rural population in the form of land rather than savings accumulated in the banks. There are also persons who mistrust financial institutions and keep savings in currency form in their homes despite an escalating price level. In this sense financial repression may not be the only contributory factor to declining saving rates, be that as it may however, these persons as all others desire a rise in their wealth and perhaps if the interest rate was sufficiently attractive there may be some attraction in holding interest earning assets.
5.4.5 Proxy Five: The Foreign-Domestic Interest Rate Differential

The fifth proxy for financial repression is the foreign-domestic interest rate differential. The results for the overall savings rate are:

\[
S/Y = -0.03496 + 0.00014YP - 0.00085FD - 0.000043FS
\]

\[
\Delta(S/Y) = -0.00015 + 0.00016\DeltaYP + 0.00284\DeltaFD - 0.00036\DeltaFS - 0.6182RES(-1)
\]

\[
(-0.3122) (3.256) (2.019) (-9.998) (-3.646)
\]

\[\text{ADJR}^2 = 0.77 \quad \text{AR}(1): F(1,25) = 0.889 \quad \text{RESET}: F(1,25) = 0.0612\]

\[B-J: \chi^2 = 5.662 \quad \text{ARCH}(1): F(1,25) = 1.473 \quad \text{CHOW}: F(4,22) = 0.108\]

\[\text{PHILLIPS} = -4.45\]

These results for the models that incorporate the foreign-domestic interest rate differential are interesting. In the long run the coefficient is negative as expected; that is the larger differential between the domestic and foreign rates stimulates a reduction in domestic savings. In the short-run, however the coefficient is positive and significant. Although controversial it can be reconciled with the economic history of Trinidad and Tobago.

In Trinidad and Tobago it was illegal to hold foreign accounts or foreign assets of any nature (until 1993). In any event there were exchange controls preventing individuals from doing so. Foreign currency could not be bought and sold in any quantities. Even when it was bought in large quantities, for example, importers wishing to obtain currency to purchase raw material there was a screening process, initially at least. If foreign currency was to be wired out of the country individuals needed to build some mechanism of doing so. Because capital flight was illegal, the mechanisms for its success was and, still is, of a clandestine nature. For these reasons, perhaps, there was no immediate adverse effect on domestic savings. Individuals continued in their accumulation of funds in domestic assets and when mechanisms were in place capital flight occurred, hence the inverse impact in the long run.

---

6 The foreign interest rate used here is the United States Treasury Bill rate. The US rate of inflation calculated from the consumer price index has been deducted from the nominal treasury bill rate to give the real interest rate.
5.4.6 Proxy Six (a): The Official-Blackmarket Exchange Rate Difference

Two proxies to represent overvaluation of the Trinidad and Tobago currency have been also incorporated in the savings models: a variable to represent the difference between the official exchange rate and the black market rate and an exchange rate misalignment variable, defined earlier. The result are as follows:

\[
S/Y = -0.0862 + 0.00018 YP - 0.0174 XD - 0.00052 FS
\]

\[
A(S/Y) = -0.0037 + 0.00014 \Delta YP - 0.00042 \Delta XD - 0.0039 \Delta FS - 0.6797 \text{RES}(-1)
\]

\[
(-0.5792) \quad (3.10) \quad (-0.0054) \quad (-10.73) \quad (-3.498)
\]

\[\text{ADJ R}^2 = 0.792 \quad \text{AR}(1): F(1,25) = 2.13 \quad \text{RESET}: F(1,25) = 0.28\]

\[B-J: \chi^2_2 = 1.66 \quad \text{ARCH}(1): F(1,25) = 1.79 \quad \text{CHOW}: F(4,22) = 0.608\]

\[\text{PHILLIPS} = -4.17\]

\[
PS/Y = 0.1451 + 0.1365 YG - 0.2728 GSY - 0.0177 XD - 0.4484 FSY
\]

\[
A(PS/Y) = -0.0018 + 0.0151 \Delta YP - 0.7773 \Delta GSY - 0.0165 \Delta XD - 0.6899 \Delta FSY
\]

\[
(-0.2873) \quad (0.1075) \quad (-4.429) \quad (-0.2016) \quad (-5.566)
\]

\[\text{ADJ R}^2 = 0.58 \quad \text{AR}(1): F(1,25) = 1.123 \quad \text{RESET}: F(1,25) = 0.0783\]

\[B-J: \chi^2_2 = 3.70 \quad \text{ARCH}(1): F(1,25) = 2.051 \quad \text{CHOW}: F(4,22) = 0.9370\]

\[\text{PHILLIPS} = -4.41\]

5.4.6 Proxy Six (b) Exchange Rate Misalignment

\[
S/Y = -0.0739 + 0.00012 YP - 0.0833 XD - 0.7218 FSY
\]

\[
A(S/Y) = -0.0036 + 0.00014 \Delta YP - 0.7766 \Delta XD - 0.7875 \Delta FS - 0.6151 \text{RES}(-1)
\]

\[
(-0.7020) \quad (1.965) \quad (-0.9962) \quad (-10.19) \quad (-3.687)
\]

\[\text{ADJ R}^2 = 0.785 \quad \text{AR}(1): F(1,25) = 0.0037 \quad \text{RESET}: F(1,25) = 0.063\]

\[B-J: \chi^2_2 = 1.4677 \quad \text{ARCH}(1): F(1,25) = 1.0397 \quad \text{CHOW}: F(4,22) = 0.3395\]

\[\text{PHILLIPS} = -4.40\]
\[ PS/Y = 0.1372 + 0.00041GD - 0.2922GSY - 0.0749XM - 0.4614FSY \]
\[ \Delta(PS/Y) = -0.0065 + 0.0002\Delta GD - 0.7813\Delta GSY - 0.0153\Delta XM - 0.6829\Delta FSY \]
\[ (-0.1150) \quad (1.278) \quad (-5.090) \quad (-0.2028) \quad (-5.739) \]
\[ - 0.5132\text{RES}(-1) \]
\[ (-3.548) \]

\[ \text{ADJR}^2 = 0.61 \quad \text{AR}(1): \quad F(1,25) = 1.125 \quad \text{RESET:} \quad F(1,25) = 0.1568 \]
\[ \text{B-J:} \chi^2 = 3.120 \quad \text{ARCH}(1): \quad F(1,25) = 1.140 \quad \text{CHOW:} \quad F(4,22) = 1.6074 \]

\[ \text{PHILLIPS} = -4.38 \]

The coefficient in the long run aggregate savings model is negative while in the short-run it is positive and insignificant. In the private savings models the coefficient is negative in both the long-run and the short-run models. This suggests that the role of the blackmarket in Trinidad is becoming more vibrant and individuals are seeking alternative forms of holding their wealth in the face of declining rates. It also suggests that if government wish to boost savings of financial institutions they cannot remain idle and allow the Trinidad and Tobago dollar to be further overvalued otherwise the blackmarket rate would gain strength and resources would be continuously diverted from financial institutions.

Exchange rate misalignment in the long run and short run for both aggregate and private saving had an adverse effect. A decline in the real effective exchange rate which suggests a real exchange rate (RER) appreciation i.e. the currency becomes more overvalued, encourages lower savings rates as resources are diverted from the official money market. The decline in the RER reflects an increase in the domestic production of tradeable goods and is indicative of a deterioration of the country's balance of payments. Higher cost structures erodes the country's savings ability. The simultaneous loss of competitiveness imply that the country's export ability is declining. For a developing country which depends on foreign reserves, the impact can be disastrous.

Based on the results of proxies Five and Six the financial repression theory cannot be rejected. In the long run, a larger difference between the domestic and foreign interest rate, overvaluation and exchange rate misalignment contribute to reducing the savings rate in the Trinidad and Tobago economy. However the insignificance of the relevant variables over the long run must be noted.
The other variables in all the models are in accordance to a priori expectations. The foreign saving variable is negatively signed and statistically significant, indicating that external funds induce domestic residents, both private and public to expand their consumption. Since aggregate income remains constant then domestic savings decline. The coefficients on real per capita income and real income growth are positively signed and as expected. However the income growth variable is occasionally statistically insignificant in the error correction representations. The higher the dependency ratio, the greater will be the pressure on the private and public sectors to increase expenditure and a subsequent reduction in the savings rate occurs. Where included, government internal debt, government savings and credit to the private appear to have an adverse effect on the accumulation of private saving. Hence there are no "surprises" with respect to the relationship between these other variables and the savings rate.
5.5 Conclusion
A summary of the empirical results, thus far, is presented in Table 5.2 together with some comments.

<table>
<thead>
<tr>
<th>Proxy</th>
<th><strong>Short Run</strong></th>
<th><strong>Long Run</strong></th>
<th><strong>Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Actual</td>
<td>Expected</td>
<td>Actual</td>
</tr>
<tr>
<td>(1) Real Interest Rate</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>(2) Dummy Variable</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(+ one when moderately negative.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Required Reserves</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(4) Inflation</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>(5) Foreign-Domestic Interest Rate</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Differential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Proxy for the overvaluation of the</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>currency</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.2
Summary table of financial repression
Proxies for the aggregate savings model

7 McKinnon-Shaw
8 Financial Repression
In Tables 5.3 to 5.6, Summary Tables of the signs of the coefficients in both the long-run and short-run models are presented. The numbering of the proxy are in accordance with the presentation of the empirical results in Section 5.4, for example, Proxy One represent the model that incorporates the interest rate, Proxy Two the Dummy Variable, Proxy Three, the Commercial Banks' Reserve and so on. In estimating private savings, four proxies of financial repression are employed. These results are presented in Tables 5.5 and 5.6.

<table>
<thead>
<tr>
<th>Proxy</th>
<th>YG</th>
<th>YP</th>
<th>FR</th>
<th>GSY</th>
<th>FS</th>
<th>DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two⁹</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six (a)</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six (b)</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.3
Summary table of coefficient signs
Long run aggregate savings models

<table>
<thead>
<tr>
<th>Proxy</th>
<th>YG</th>
<th>YP</th>
<th>FR</th>
<th>GSY</th>
<th>FS</th>
<th>DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two¹⁰</td>
<td>+</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six (a)</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six (b)</td>
<td>+</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.4
Summary table of coefficient signs
Short run aggregate savings models

⁹ Represents the dummy variable: one when moderately negative.

¹⁰ Represents the dummy variable: one when severely negative.
The empirical results are conflicting and depend upon the proxy that is used to represent financial repression. Based on the diagnostics the models are acceptable. Generally the $R^2$ for the aggregate savings model are higher than those of the private savings models. The absence of reliable disaggregated data is largely responsible for this. The Phillips' test for stationarity of the residual (from the long run regression) shows a non-acceptance of the null hypothesis for all models. With respect to non financial repression explanatory variables there are no inconsistencies between long-run and short-run.

The McKinnon-Shaw hypothesis suggests that a financially repressed economy marked by restrictive characteristics should embark upon policies aimed at liberalising the economy. That is, allowing the forces of demand and supply to play a more important role and removing ceilings, floors and various controls that may exist on prices. As suggested earlier, action along this path engenders higher growth levels by stimulating savings and investment. However, the estimates of the real interest rate and inflation

$^{11}$ See footnote 4 in Chapter 4.
models suggest otherwise i.e. liberalisation through higher real interest rates does not mobilise additional savings. The coefficient of the real interest rate is significantly negative in the short run. While that of the inflation rate is significantly positive.

The results for the models that incorporate the dummy mildly suggest otherwise. For the period over which the dummy is one to represent moderately negative rates, the coefficient is positive although insignificant. It becomes negative only when severely negative real interest rates are incorporated. This indicates that while a little financial repression is not altogether harmful for the economy, too much financial repression may be detrimental.

Furthermore, the estimates of the coefficient of the domestic-foreign differential suggest that if the domestic rates are in alignment with the foreign rate, that is, there is a declining difference between domestic and foreign interest rates, a higher savings rate would be stimulated, over the long run. From this perspective it can be concluded, that liberalisation which reduces this gap would serve to increase savings rates.

The analysis seems to suggest that isolated increases in the interest rate do not create greater incentives to save. One possible reason, is that increases in the domestic rate may not subsequently reduce the gap that exists between domestic and foreign rates (perhaps because the foreign rate also increased). Consequently there is no downward movement in the gap. Rather, interest rate increases in Trinidad and Tobago should produce a decline between the domestic and the foreign rate. This suggests that if financial liberalisation is to produce its desired effects as posited by McKinnon and Shaw, then it should be relative i.e. not absolute in the sense that policies and potential policies of other countries are not taken into consideration.

When financial repression is redefined to incorporate the overvaluation of the domestic currency the results suggest that controls on the exchange rate should be relaxed. The country should not pursue a fixed exchange rate regime which continuously overvalues the currency. According to the long run estimates, as the disparity between the official and the blackmarket rate grows, domestic savings suffer. A similar effect occurs as the currency becomes more misaligned. The policy prescription emanating is one of liberalisation aimed at closing the gap between the official and the blackmarket rate and lowering the degree of real exchange rate misalignment. However the insignificance of the relevant variable serves as a caution so as not to implement intensive liberalisation policies too quickly.
CHAPTER SIX

Investment, Financial Repression and Financial Liberalisation

6.1 Introduction

There has been little attempt to empirically study the relationship between investment, financial repression and the potential of financial liberalisation. The accumulation of capital resources has long been regarded as one of the major factors in economic development. While financial repression, be it in the form of negative real interest rates, overvalued currency or a disparity between domestic and foreign interest rate has always plagued developing countries. Until recently empirical studies of investment in less developed countries have ignored financial repression. There appeared a tendency to focus on the general determinants of investment activity (Wai and Wong, 1982; Greene and Villanueva, 1991), rather than on a phenomenon that exists in the economy.

One of the main reasons for the scanty research on the determinants of private investment in the developing world is the scarcity of private investment data. Estimates of capital stock are virtually unobtainable for developing countries. In addition there is no detailed distinction between private and public investment. In an attempt to help resolve this problem Pfefferman and Madrassay (1989) have constructed a reasonably consistent private investment series for thirty developing countries one of which is Trinidad and Tobago. Unfortunately, the series only extends from 1982 to 1990. In addition to the short span of the series, the data is of annual frequency. Few developing countries have reliable quarterly data on investment. These limitations force the estimation of sparsely specified models or some attempt at the pooling of data. Blejer and Khan (1984) produced a private investment model for twenty four developing countries with pooled data over the period 1971-79. In this study three Caribbean countries were incorporated: Trinidad and Tobago, Barbados and Haiti.

If an economy is financially repressed, liberalisation policies should be implemented so as to augment savings which would subsequently have multiplicative effects on the economy. According to the theory, it is expected that rising investment rates would follow. If this cannot be empirically shown then we should be wary about liberalisation policy, since the evidence does not support the McKinnon-Shaw hypothesis.
Clarity of the determinants of private investment in LDCs is important as it must be perceived of as a catalyst to attract foreign capital in addition to its traditional role as a contributor to economic growth and employment creation. This is especially important since the opportunity cost of investing in LDCs has recently increased with the debt crisis and political instability as well as improved profitability in developed countries and the opening up of eastern Europe (Chibber et al, 1992). If there is no revival in domestic private investment in developing countries it appears unlikely that there will be any significant capital flows to these economies.

6.2 Factors Affecting Private Investment

In this chapter the central hypothesis to be tested is whether financial repression hinders investment. Based on the theory, an increase in financial repression decreases the availability of investible resources and investment declines. As in Chapter Five on savings, six proxies of financial repression are incorporated separately in the investment model. A cointegration methodology is employed to give a short run dynamic model and a long run static equation for each proxy. In order to reiterate, these proxies are:

1. The Real Interest Rate
2. A Dummy Variable
3. The Reserve Requirement Ratio
4. The Inflation Rate
5. The Foreign-Domestic Interest Rate Differential
6. A variable to represent the deviation of the actual exchange rate from its equilibrium level.

It is important to distinguish between the user cost of capital and the deposit rate of interest as a determinant of investment. Most empirical studies have tended to focus on the user cost of capital as the appropriate interest rate and neglect the role of the deposit rate in stimulating investment. In developing countries a large proportion of resources for investment originates from the investor rather than through the issuance of stocks. Hence it would be of interest to explore the role of the deposit rate in stimulating investment.

Some empirical studies that incorporate the user cost of capital find that there is no significant effect on investment activity. One of the reason for this behaviour is that since the financial markets in many developing countries are repressed, credit policy may affect investment directly through the stock of credit available to the firms rather
than indirectly through the interest rate channel. Financial repression does not only apply to controls on the deposit rate but also on the loan rate. The government of Trinidad and Tobago in an attempt to boost investment in certain areas, for example, the agriculture and manufacturing sectors, make concessions available to these groups. One of which might be concessionary rates on loans, however there are limitations on the amount of resources which can be obtained through this channel. Thus the credit accessibility to investors becomes the factor that can restrict investment activity. The institutional framework of financial markets in less developed countries plays an important role in the investment process.

McKinnon's complementarity hypothesis suggests that individuals must accumulate money balances prior to investing. This stems from the assumption that investors are confined to self finance and investment expenditure tend to be lumpy. While Shaw's debt intermediation view states that financial intermediation makes external resources available to investors, that is they are not confined to self finance. Despite the stance taken, both McKinnon and Shaw maintain that the lifting of restrictive policies, for example, the removal of interest rate controls, or the abandonment of a fixed exchange rate regime creates a more attractive environment for increasing investment.

This study is not intended to detract from the user cost, but because of the nature of investment, the capital market and the institutional framework in developing countries the deposit rate might prove to be an important factor in the investment process. In developed countries the user cost of capital continues to be an important determinant in the investment process. The rudimentary state of the capital market and the lack of debt through equity imply that personal saving in an important source of funding for investment. In light of this the deposit rate as the medium for attracting savings becomes important in the investment process. By assuming a positive relationship between the real interest rate and investment McKinnon and Shaw abandons the standard neoclassical investment model in which there is a negative influence of higher rates on investment via increases in the user cost of capital.

6.2.1 Government Investment
It can be argued that government investment complements private investment (Musalem, 1989; Khan and Reinhart, 1990), or alternatively crowds out private investment (Bclassa, 1988). This can only be resolved empirically. There are a number of reasons why it might be believed that private investment could be
positively related to government investment. Firstly, most developing countries have a large component of government investment concentrated on infrastructural projects, for example, transport, communication, power and water supply. The creation of such facilities will reduce the cost of production and thus increase the profitability for private investors. Government investment can also act as a catalytic agent. This is especially apparent in agricultural research. The introduction of irrigation facilities, breeding stations or new high yielding seeds through government's efforts can induce additional private investment. Even where government investment is in secondary or tertiary investment, the establishment of new factories should increase the demand for related products. In less developed countries resources tend not to be fully-employed. An injection of government investment would increase income directly as well as indirectly through the multiplier effect so that private investors would be encouraged to invest more since profitability would tend to increase with the expected demand for financial products.

Public investment of this nature can enhance the possibility for private investment and raise the productivity of capital. Overall resource availability can be augmented by expanding aggregate output. Public investment is not all good, it can detract from private investment activity to the extent that it substitutes for or crowds out private investment. It can compete with the private sector directly for scarce physical and financial resources. The financing of public sector investment whether through taxes, issuance of debt or inflation will lower the resources available to the private sector and depress private investment activity. If government investment involves enterprises producing goods that compete with industries in the private sector that produces similar goods, demand in the private sector may contract and investment levels decline.

The overall effect of government investment on private investment will depend on the relative strengths of these forces and there is no a priori reason to believe that they are complements or substitutes. It remains an empirical issue. Another variable that can be perceived as an alternative to private investment is the fiscal deficit. Larger deficits reduces the availability of credit to the private sector, for example, if government borrows from the same source as the private sector, or increase taxes. Efforts to reduce the fiscal deficit may involve cutting back on public investment (Serven and Solimano, 1992). Some of these expenditures which are complementary to private investment, for example, the construction of transport and communication network, serve to reduce private investment. The importance of fiscal deficits and the implications for private investment became emphasised in the 1980s as the adoption of adjustment programmes led many developing countries to cut fiscal deficits via
reductions in public investment. If private investment and public investment are complementary then a fall in private investment should be observed in those countries that adopted adjustment programmes. If the reverse is true private investment would have risen.

An interesting point is explored by Khan and Rheinhart (1990). They examined the role of private investment in economic growth for developing countries and argued that while there is growing support for a greater role for private investment there is no discussion on its relationship with economic growth. Growth models incorporate aggregate investment and there is no discrimination between private and public investment. Hence it is not possible to determine whether policies designed to stimulate private investment at the expense of government will necessarily help the growth rate. There is no conclusive empirical evidence to support that one is better than the other in so far as long run economic growth is concerned. Their empirical work however indicates that private investment play a much larger and more important role in the growth process than government investment. There is no statistically significant effect of government investment on growth.

6.2.2 Credit to the Private sector

Funds borrowed from financial institutions in the form of credit to the private sector (Sundararajan and Thakur, 1980) constitute an injection and should augment private investment. Firms and enterprises in developing countries, though still small compared to their counterparts in the developed world have exceeded the financial capabilities of the entrepreneur from his own resources, that is, individuals become constrained by their own resources and seek additional funding from financial institutions. The capital market is virtually new in most developing countries including Trinidad and Tobago and does not play an important role in debt financing as yet, thus the dependency on loans from banks are high because this is the main source of external finance. An increase in bank credit will generally encourage investors to undertake a larger amount of capital formation.

It has been argued that money and capital are complements (McKinnon, 1973), rather than substitutes as in developed countries. In such economies, accumulating money balances is the mechanism through which capital formation takes place. The greater the balances accumulated in banks the greater will be ability to offer credit to the private sector and hence the ability to offer resources for investment. In developing countries a large proportion of machinery and equipment is imported and in some instances advance import deposits are required. Credit availability will assist in
facilitating imports and exercise a positive influence on private investment (Wai and Wong, 1982).

The consensus which has thus emerged is that one of the principal constraints on investment in developing countries is the quantity of financial resources rather than the availability of possible investment projects. The rates of return on investment are quite high while the interest rate on loanable funds to priority sectors are kept low by the government. Because the amount of financing is limited it appears to be legitimate to hypothesise that the private investors in less developed countries are restricted by the level of bank financing that is available. That is, not all investment projects with positive returns will receive adequate financing. Both institutional and economic reasons dictates why this may not be so. The former refers to the underdevelopment of the capital market and regulatory rules for credit allocation. When interest rates are kept at subsidised levels they become an inefficient devise to sort the good from the bad borrowers and credit rationing becomes the preferred tool for lending by creditors.

Whether or not credit availability play an important role in the investment process depends on the cost of obtaining the credit. This is important especially for those investors who are not part of the priority group receiving loans at concessionary rate. If the cost is too high, potential investors may be forced to forego their investment projects. The profitability of potential investment project also plays an important role. It seems likely that investment would only be undertaken by the private sector, if the rate of return on the project is greater than the cost of obtaining the resources to be invested. In other words credit availability would only positively influence investment if it can be obtained at a reasonable price which is less than the return of the project. Unfortunately it is virtually impossible to obtain this type of data for Trinidad and Tobago.

6.2.3 Foreign Savings

Within the context of the flow of funds, foreign capital constitutes an injection of resources to the domestic economy. Early models view foreign savings as a tool for increasing investment directly as well as raising the rate of capital accumulation by increasing the level of income. Whether it augments private investment or not depends on the institutional arrangements within the economy, for example, the type and nature of credit rationing. The government may play an important role in deciding the recipients of foreign funds as well as the amount to be awarded. They may also discriminate between funds for investment and consumption as well as the
proportion that will be withheld for public sector activities. The final impact of foreign capital on private investment depends on these various issues.

The results of the savings models indicated that foreign savings are inversely related to domestic savings. However the coefficient is less than one, this suggests that a rise in the foreign savings reduces the domestic saving ratio but not by an equivalent value. That is the foreign savings ratio does not fall by the exact proportion of the rise in foreign savings. If, for example, the coefficient of foreign savings is -0.56, then for every unit increase in the foreign saving, domestic savings are reduced by 0.56 of that unit (or £560,000, if denominated in millions). Hence total resources available domestically has increased. In the example £440,000 represents the additional resource available within the economy. Based on this initial result a positive relationship is expected between foreign savings and investment. If the coefficient was -1.0 then there would be no additional resources as domestic savings would reduce by an amount equivalent to the rise in foreign savings. If it was greater than one then a negative relationship would be expected between foreign savings and investment as the reduction in domestic savings outweigh the rise in foreign savings.

Foreign direct investment is becoming more significant as a component of foreign capital (Wai and Wong, 1982). It may have a direct linkage effect on investment in domestic industries as well as an accelerator effect. It may also make possible the import of necessary capital goods. Also to the extent that foreign capital increases money supply, firms would tend to increase purchase including capital goods. If investment undertaken as a result of the foreign capital is export-oriented there may be a indirect positive impact on investment. However, foreign saving may also support the import of consumption goods. As it increases the money supply of a country there may be a subsequent adverse impact on the trade account which in turn may have negative implication for investment.

6.2.4 External Debt
External debt may serve to augment private investment in a similar manner as credit to the private sector. However it may also reduce investment activity (Serven and Solimano, 1993). Firstly, if a country has substantial external debt which causes difficulties in meeting debt service obligations, relations with external creditor may deteriorate which can lead to a reduction in the amount of trade financing a country can obtain. As a result it becomes more difficult and costly to finance private investment since trade play an important role in most investment projects undertaken in developing countries. Secondly the existence of a large debt overhang in the form
of a high ratio of external debt to GDP may reduce the incentives for investment because much of the forthcoming returns to investment must inevitably be used to repay existing debt, therefore acting as a tax on investment. Higher debt-service payments which are also associated with larger external debt reduces the funds available for investment.

Developing countries whose currencies are not internationally accepted suffer with devaluations of the domestic currency. Because reserves are of utmost importance, (i.e. it is necessary to import intermediate and capital goods, and food) repayment of foreign debt shakes the foundation of the economy. Helpman (1988) suggests that debt overhang raises expectations of future capital taxes and depresses investment, while Roderik (1989) argued that the debt crisis created uncertainty and reduced risk-aversion.

Another line of reasoning points to the drying up of external credit since 1982 and argues that this caused indebted countries to adjust in ways that further depressed investment, for example printing of money, issuing internal debt and crowding out private investment, and forcing domestic banks to hold public debt. These effects, it is believed were triggered by the cut-off in international credit to governments in late 1982.

There is general agreement that the debt crisis was caused partly by declining export prices for debtor countries, high world interest rates and sluggish growth in the industrialised countries producing a slowing down in the engine or growth. It appears to be plausible to infer that the same shocks that caused the debt problems probably caused the decline in investment (Warner, 1992).

6.2.5 Stability and Adjustment
Private investment activity has been hypothesised as a positive function of income growth and real per capita income. There is a greater ability of higher income individuals to devote resources to saving. This ability is particularly important in developing countries given the rudimentary nature of the capital markets, since it appears that most investment projects must be financed, at least in part through personal savings.

Macroeconomic stability is a crucial factor in determining the degree of confidence investors attach to their expectations of future growth and therefore their need for additional capital stock. One typical sign of instability is inflation. Pastor and Hilt
(1993) incorporate inflation in their model as an indicator of macroeconomic instability, since high rates of inflation increase the risk of long-term investment. The irreversible nature of most investments makes private investors particularly sensitive to risk and dampens their spirit in times of uncertainty. While moderate rates of inflation enhance investment by raising short-term profit expectations, high rates over prolonged period creates the instability and engenders less investment activity. In this study an inflation variable is being incorporated in the model but as a proxy for financial repression. Perhaps financial repression can be seen as an indicator or economic instability: the more financially repressed is the economy the more unstable it is. The difference in employing inflation as a financial repression variable as opposed to a macroeconomic indicator of instability lies in the implications for financial liberalisation.

In 1987/88 Trinidad and Tobago negotiated loans from the International Monetary fund and the World Bank. A structural adjustment programme was subsequently implemented. Adjustment programmes may have a stunting effect on private investment because of the restrictive monetary and credit policies. One of which is a reduction of the fiscal deficit. This can have serious implications for private and investment as mentioned above. One element of IMF conditionality is the increase in the interest rate. There may be a tendency for investment to fall as the user cost becomes more important in the investment process. Another frequent ingredient of adjustment programmes is currency devaluation. A depreciation can affect investment through three channels (Serven and Solimano, 1993). Firstly investment undertaken in developing countries has a high import content via imported machinery, equipment and sometime technical expertise. Secondly, a devaluation raises the price level on final goods through its impact of imported intermediate goods. Thirdly, it affects aggregate demand. According to Chibber and Shafik (1992) it alters the real product wage thereby affecting profitability as well as affecting the nominal and real interest rate which in turn affects the supply price of capital. Because the effects of these channels may go in opposite directions the net impact of a devaluation may be complex and theoretically indeterminate. The effects in the short run also differ from those of the long run.

Based on the discussion above, a general specification of the private investment model and the expected signs of the relevant variables for Trinidad and Tobago are as follows:

\[
\frac{IP}{Y} = f(YG, FR, FS, IG, GED)
\]
\[
\frac{\partial (IP/Y)}{\partial YG} > 0; \frac{\partial (IP/Y)}{\partial FR} < 0; \frac{\partial (IP/Y)}{\partial FS} > 0; \frac{\partial (IP/Y)}{\partial IG} < 0; \frac{\partial (IP/Y)}{\partial GED} > 0
\]

The aggregate investment model is also estimated. Its general form is as follows:

\[
\frac{I}{Y} = f(YG, FR, FS, GED, ROS)
\]

where \(I_p\) is private investment. This is defined as gross capital formation less government capital expenditure. \(I\) is real aggregate investment, which may be used as a dependent variable instead of the ratio of investment to income. \(GED\) is government external debt. Credit to the private sector (\(CP\)) may also be incorporated into the model. Its influence may either be positive or negative, depending on the attitudes of investors. \(ROS\) represents the real overall surplus on the balance of payments. All variables are expressed in real terms.\(^1\)

6.3 Empirical Results and Implications for Policy

The results for the various investment models are presented in a format similar to those in Chapter Five. The long run regression for each set of results are followed by the short run regression which only includes stationary variables. All variables in the short run regression have been differenced once to obtain stationarity. All variables in the long run model are integrated of order one. Phillips (PHILLIPS) is the test for the presence of a unit root in the residual of the long-run model. Res(-1) incorporated in the short-run models, represents the lagged residual from the long run regression.

\(^1\) This model can be perceived as an extension of the flexible accelerator model in which investment is a function of the change in total output demanded:

\[
I_t = v(\Delta Y_t)
\]

In the above \(Y_t\) specification is the rate of change in real output:

\[
YG = \frac{\Delta Y_t}{Y_t}
\]

This adoption of the flexible accelerator model is not intentional. Because of the methodology utilised in the estimation we are forced to use the change in income as the appropriate explanatory variable. In the cointegration methodology, all variables in the long run model must be integrated of the same order. Most of the level series incorporated in the model are integrated of order one. Based on this evidence real income may also be expected to be integrated of order one. If this proved to be true then investment would have been specified as a function of real output:

\[
I_t = g(Y_t)
\]

However, real income was integrated of order two. In order to allow for legitimate estimation the first difference was used as the relevant income variable.
't' statistics are in parenthesis. The diagnostics for the short-run model are presented immediately below the 't' statistics (see Table 5.1 in Chapter 5).

The Phillips-Perron (Tables 4.2 to 4.6) test indicated that all variables incorporated in the long run models are integrated of order one i.e. I(1). The residuals that are obtained from the regressions are also stationary as illustrated by the Phillips test. Furthermore, when these have been incorporated in the short run models the coefficients are negative significant and less than -1. According to the diagnostics the short run models are correctly specified in the sense that they are free from serial correlation, heteroskedasticity, misspecification and instability.

6.3.1 Proxy One: The Real Interest Rate
The results for the investment model using the real interest rate as the proxy for financial repression are presented below. Estimates for the aggregate savings model follow those of the private savings model.

\[
\begin{align*}
\text{IP/Y} &= 0.1481 + 0.6014Y_G + 0.00016FS - 0.0028R - 0.00025IG \\
\Delta(\text{IP/Y}) &= -0.0022 + 0.1662\Delta Y_G + 0.00013\Delta FS - 0.0029\Delta R - 0.00018\Delta IG - 0.6377RES(-1) \\
\text{ADJ R}^2 &= 0.58 \\
\text{B-J: } \chi^2 &= 4.682 \\
\text{ARCH(1): } F(1,25) &= 0.290 \\
\text{PHILLIPS: } &= -4.63
\end{align*}
\]

\[
\begin{align*}
\text{I/Y} &= 0.1224 + 0.5652Y_G + 0.4782FS - 0.0032R - 0.0079GD + 0.00085EXP \\
\Delta(\text{I/Y}) &= -0.0824 + 0.3564\Delta Y_G + 0.3639\Delta FS - 0.0031\Delta R - 0.00005\Delta GD + 0.00001\Delta EXP - 0.7462RES(-1) \\
\text{ADJ R}^2 &= 0.512 \\
\text{B-J: } \chi^2 &= 5.11 \\
\text{ARCH(1): } F(1,25) &= 0.028 \\
\text{PHILLIPS: } &= -5.68
\end{align*}
\]
These results suggest that financial liberalisation will not serve to increase private investment or aggregate investment rate in either the long run or the short run. This should not be totally surprising since it was alluded to in the results of the saving model. Higher real interest rate did not stimulate higher levels of saving and consequently did not have positive multiplicative effects. Further more, its impact is significant on investment in the short run. From the point of view that investment must be prefaced by savings this result should have been anticipated. It would be illogical for higher interest rate to stimulate additional investment if it does not encourage additional savings. Based on the above assumption of the M-S hypothesis if savings is not increased in response to higher interest rate then it is not likely that investment will be increased.

If the McKinnon-Shaw hypothesis is to hold then higher interest rates should stimulate a higher investment rate. Financial liberalisation would then represent one means of corrective policy for an economy with low level of savings and investment. This result, however indicates that policy makers should be wary of financial liberalisation policies. As suggested above a possible reason for this relationship might be attributed to the fact that interest rate increases that occurred over the period were to small to attract savers and investors. Despite nominal increases real rates remained negative and savers/investors were not sufficiently induced to increase savings, and hence the source of investment funding diminished.

An interesting point to note is the relationship between the deposit rate and the loan rate. Movements in one are reflected in the other. If this is so, then the deposit rate can be interpreted as reflecting the user cost of capital. As such, it suggests that the orthodox Neoclassical relationship between the user cost of capital and investment might be applicable to Trinidad and Tobago. Its implication can be quite revealing since it suggests that in Trinidad and Tobago external capital is becoming more important in the investment process. This may be the reason as to the inverse relationship between the real deposit rate and the investment rate. Investors are becoming less reliant on their personal finances and seeking more external finance. It also provides further insights - the tendency to refute McKinnon's complementarity hypothesis and supports Shaw's debt intermediation view.
6.3.2 Proxy Two: Dummy Variables

The results for the dummy variables are presented below. In the first set of results (private savings) in this section a dummy of one represents moderately negative rates, while in the latter a dummy of one represents severely negative rates. In the first instance models for private are given followed by those for the overall investment rate. As these models include variables which are stationary and non stationary, the cointegration methodology is not applicable. Consequently standard modelling procedures are employed and there is no distinction between long run and short run.

\[
\begin{align*}
\text{IP/Y} &= 0.1500 + 0.5472 \text{YG} + 0.2929 \text{FSY} + 0.0215 \text{D1} - 0.5768 \text{IG} \\
&= (6.691) (3.023) (2.731) (1.137) (-3.188) \\
\text{ADJ } R^2 &= 0.55 \\
\text{AR(1): } F(1,25) &= 1.523 \\
\text{RESET: } F(1,25) &= 1.095 \\
\text{B-J: } \chi_2^2 &= 3.462 \\
\text{ARCH(1): } F(1,25) &= 1.534 \\
\text{CHOW: } F(4,22) &= 1.254
\end{align*}
\]

\[
\begin{align*}
\text{IP/Y} &= 0.1676 + 0.4663 \text{YG} + 0.2121 \text{FSY} - 0.0097 \text{D2} - 0.4454 \text{IG} \\
&= (6.419) (2.39) (1.947) (-0.856) (-2.587) \\
\text{ADJ } R^2 &= 0.51 \\
\text{AR(1): } F(1,25) &= 1.832 \\
\text{RESET: } F(1,25) &= 1.393 \\
\text{B-J: } \chi_2^2 &= 1.805 \\
\text{ARCH(1): } F(1,25) &= 0.952 \\
\text{CHOW: } F(4,22) &= 0.6384
\end{align*}
\]

\[
\begin{align*}
\text{I/Y} &= 0.1277 + 0.4803 \text{YG} + 0.4275 \text{FSY} + 0.0283 \text{D1} - 0.00079 \text{GD} + 0.00009 \text{EXP} \\
&= (3.625) (3.277) (4.027) (1.721) (-4.228) (2.088) \\
\text{ADJ } R^2 &= 0.66 \\
\text{AR(1): } F(1,25) &= 0.256 \\
\text{RESET: } F(1,25) &= 0.129 \\
\text{B-J: } \chi_2^2 &= 2.726 \\
\text{ARCH(1): } F(1,25) &= 0.761 \\
\text{CHOW: } F(4,22) &= 1.307
\end{align*}
\]

\[
\begin{align*}
\text{I/Y} &= 0.1423 + 0.4779 \text{YG} + 0.4127 \text{FSY} - 0.0168 \text{D2} - 0.00082 \text{GD} + 0.00011 \text{EXP} \\
&= (3.240) (3.114) (3.810) (-0.986) (-4.241) (2.274) \\
\text{ADJ } R^2 &= 0.64 \\
\text{AR(1): } F(1,25) &= 0.314 \\
\text{RESET: } F(1,25) &= 0.850 \\
\text{B-J: } \chi_2^2 &= 1.239 \\
\text{ARCH(1): } F(1,25) &= 0.825 \\
\text{CHOW: } F(4,22) &= 1.239
\end{align*}
\]
The models that incorporate the dummy variables tend to support the M-S hypothesis. However the coefficients are never significantly different from zero. When the coefficient is zero/one for positive and moderately negative rates respectively the coefficient is positive. When the dummy is redefined as one for severely negative (greater than -5) the coefficient is negative. This would seem to infer that while moderately negative positive rates do not discourage investment, severely negative acts as a deterrent. Once again these results infer that while a little financial repression may not be harmful, severe financial repression may be damaging to the economy. Similar relationships exist between savings and the interest rate\(^2\). Based on these results the McKinnon-Shaw hypothesis cannot be rejected.

6.3.3 Proxy Three: Commercial Bank Reserve Requirement

The next proxy for financial repression is the commercial bank reserve requirement, these results are presented below.

\[
\begin{align*}
\text{IP/Y} &= -0.1261 + 0.00024YP + 0.00016FS - 0.0005IG - 0.0001GD \\
\Delta(\text{IP/Y}) &= -0.0037 + 0.00027\Delta YP + 0.00013\Delta FS - 0.00012\Delta CR - 0.00073\Delta IG \\
&\quad (-0.717) \quad (3.321) \quad (3.437) \quad (-0.6957) \quad (-4.628) \\
&\quad -0.0001\Delta GD - 0.7375\text{RES(-1)} \\
&\quad (-1.041) \quad (-4.031) \\
\text{ADJ R}^2 &= 0.62 \quad \text{AR(1): } F(1,25) = 0.756 \\
\text{B-J } \chi^2 &= 4.931 \quad \text{ARCH(1): } F(1,25) = 0.579 \\
\text{PHILLIPS} &= -4.67 \quad \text{RESET: } F(1,25) = 0.239 \\
\text{CHOW: } F(4,22) &= 0.633 \\
\text{I/Y} &= -0.0233 + 0.00014YP + 0.2561FSY - 0.00006CR - 0.0004GD + 0.00011EXP \\
\Delta(\text{I/Y}) &= -0.0022 + 0.00018\Delta YP + 0.2295\Delta S Y - 0.0003\Delta CR - 0.00006\Delta GD \\
&\quad (-0.425) \quad (2.559) \quad (2.508) \quad (-1.332) \quad (-1.016) \\
&\quad + 0.00001\Delta EXP - 0.6564\text{RES(-1)} \\
&\quad (1.192) \quad (-3.414) \\
\text{ADJ R}^2 &= 0.54 \quad \text{AR(1): } F(1,25) = 0.539 \\
\text{B-J: } \chi^2 &= 2.107 \quad \text{ARCH(1): } F(1,25) = 1.090 \\
\text{PHILLIPS} &= -4.63 \quad \text{RESET: } F(1,25) = 0.267 \\
\text{CHOW: } F(4,22) &= 0.857 \\
\end{align*}
\]

\(^2\) See Chapter Five for a discussion.
The model that incorporates required reserve ratio suggests that higher ratios reduces the investment rate. An incongruity becomes apparent with this result. Based on economic theory lower required reserves allowed higher interest rates. Since we have already found an inverse relationship between the latter and the investment rate, the relationship between the reserve ratio and investment should be positive. However, in accordance with economic theory the relationship is negative in our empirical model. A similar inconsistency existed in the results for the savings model. One reason for this behaviour might be the attitude of policy makers. In Trinidad and Tobago the government plays a very important role in the implementation of monetary policy. It manipulates the required reserve rate and the interest rate independently of each other.

6.3.4 Proxy Four: The Rate of Inflation
The results for the models that incorporate inflation as the relevant proxy for financial repression are presented below. Estimates for the private savings ratio are followed by those for aggregate investment.

\[
\begin{align*}
\text{IP/Y} & = -0.2070 + 0.2275YG + 0.00009INF - 0.0002IG - 0.00005GD \\
\Delta(\text{IP/Y}) & = -0.0034 + 0.1750\Delta YG + 0.0021\Delta INF - 0.00073\Delta IG - 0.00001\Delta GD - 0.6551RES(-1) \\
\text{ADJ R}^2 & = 0.57 \\
\text{RESET: } F(1,25) & = 0.903 \\
\text{PHILLIPS} & = -4.45
\end{align*}
\]

\[
\begin{align*}
\text{I} & = -411.42 + 923.6YG + 630.4FSY + 6.2389INF - 0.0543GD + 0.4069YP \\
\Delta I & = -1.5701 + 323.06\Delta YG + 540.03\Delta FSY + 0.44856\Delta INF - 0.0309\Delta GD \\
\text{RESET: } F(1,25) & = 0.903 \\
\text{PHILLIPS} & = -4.45
\end{align*}
\]
The relationship between inflation and the investment rate reinforces the advice of exercising caution in the implementation of financial liberalisation policies. According to the financial repression theory higher levels of inflation is indicative of higher levels of financial repression and serves to retard the investment rate and hinder economic growth. Our empirical evidence suggest otherwise. In both the long run and the short run inflation has a positive impact, however in the short run (for private investment) it is statistically insignificant. A possible reason is that higher inflation levels makes the individuals more determined to save and hence increases the resource-base for investment.

Higher inflation rates can substantially reduces the real cost of investment if the user cost of capital is relevant and the investor largely depends on external finance. It reduces the opportunity cost and artificially inflates the number of profitable investment projects i.e. projects which would not have being undertaken because of potential unprofitability when real interest rates are taken into consideration. From this perspective higher inflation allows greater desired investment. Whether or not economic growth takes place (as a result of higher investment) depends on the nature of the investment project and on developments in the long-run well as the availability of resources at high levels of inflation.

6.3.5 Proxy Five: The Foreign-Domestic Interest Rate Differential
The fifth proxy for financial repression is the difference between the foreign and domestic real interest rate. The results are as follows:

\[
\begin{align*}
\text{IP/Y} & = -0.0038 + 0.00016\text{YP} - 0.0028\text{FD} - 0.00005\text{GD} - 0.0005\text{IG} \\
\Delta(\text{IP/Y}) & = -0.0039 + 0.00025\Delta\text{YP} + 0.0014\Delta\text{FD} - 0.0061\Delta\text{GD} - 0.0061\Delta\text{IG} - 0.6193\text{RES(-1)} \\
\text{ADJR}^2 & = 0.60 \\
\text{B-J: } \chi^2 & = 2.752 \\
\text{PHILLIPS} & = -4.54
\end{align*}
\]

\[
\begin{align*}
\text{AR(1): } F(1,25) & = 0.199 \\
\text{RESET: } F(1,25) & = 1.231 \\
\text{ARCH(1): } F(1,25) & = 0.156 \\
\text{CHOW: } F(4,22) & = 0.343
\end{align*}
\]
The result for Proxy Five indicate that the greater the difference between the domestic and the foreign real interest rate the greater will be the reduction in the investment rate. Its impact on the investment rate is positive but insignificant while the long run impact is negative. This is valid for both private and aggregate investment. Possible explanations for this behaviour are discussed in Chapter Five, where the results of the savings model are similar.

6.3.6 Proxy Six (a): The Official-Blackmarket Exchange Rate Difference
The result for the first measure of overvaluation (the spread between the official and the blackmarket rate) is presented immediately below. This is then followed by the second measure (the degree of exchange rate misalignment). Based on the results both proxies of financial repression contribute to a decline in funds available for domestic investment (private and aggregate).

I= -398.93 +4765YP +208.26FSY -2.1220FD -0.0787GD
ΔI= -2.1254 +0.5824ΔYP +312.40ΔFSY +4.3205ΔFD -0.0461ΔGD -0.6718RES(-1)
(-0.240)  (6.779)  (2.182)  (1.778)  (-0.676)  (-3.448)

ADJ R² = 0.58  AR(1): F(1,25) = 1.362  RESET:F(1,25) = 0.029
B-J:  χ² = 2.834  ARCH(1): F(1,25) = 0.065  CHOW: F(4,22) =0.116
PHILLIPS =-4.93

The result for Proxy Five indicate that the greater the difference between the domestic and the foreign real interest rate the greater will be the reduction in the investment rate. Its impact on the investment rate is positive but insignificant while the long run impact is negative. This is valid for both private and aggregate investment. Possible explanations for this behaviour are discussed in Chapter Five, where the results of the savings model are similar.

6.3.6 Proxy Six (a): The Official-Blackmarket Exchange Rate Difference
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IP/Y= -0.1825 +0.3308YG +0.17666FSY -0.0357XD -0.00005IG
Δ(IP/Y)= -0.0043+0.3108ΔYG +0.1776ΔFSY -0.02987ΔXD -0.000032ΔIG
(-0.652)  (0.756)  (2.048)  (-0.375)  (-2.195)
-0.5949RES(-1)
(-4.351)

ADJ R² = 0.55  AR(1): F(1,25) = 1.664  RESET:F(1,25) =1.226
B-J:  χ² = 4.192  ARCH(1): F(1,25) = 0.036  CHOW: F(4,22) = 0.297
PHILLIPS =-4.51
\[ I/Y = 0.1039 + 3801YG + 0.4053FSY - 0.0294XD - 0.000063GD + 0.0016EXP \]
\[ \Delta(I/Y) = -0.0033 + 0.2039\Delta YG + 0.2749\Delta FSY - 0.0382\Delta XD - 0.000037\Delta GD \]
\[
\begin{array}{cccc}
-0.516 & 1.326 & 3.020 & 0.478 & -0.946 \\
(0.005) & -0.736 & 8RES(-1) & & \\
(1.007) & & (-3.711) & & \\
\end{array}
\]
\[ \text{ADJ } R^2 = 0.51 \quad \text{AR(1): } F(1, 25) = 1.116 \quad \text{RESET: } F(1, 25) = 0.089 \]
\[ B-J: \chi^2 = 2.234 \quad \text{ARCH(1): } F(1, 25) = 0.509 \quad \text{CHOW: } F(4, 22) = 0.203 \]
\[ \text{PHILLIPS } = -5.05 \]

6.3.6 Proxy Six (b): Exchange Rate Misalignment
\[ I/P/Y = -0.0723 + 0.00016YP + 0.000116FS - 0.2638XM - 0.00039IG \]
\[ \Delta(I/P/Y) = -0.0039 + 0.00018\Delta YP + 0.00009\Delta FS - 0.06056\Delta XM - 0.00051\Delta IG - 0.69368RES(-1) \]
\[
\begin{array}{cccc}
-0.847 & 2.344 & 2.415 & -0.952 & -3.53 & -4.415 \\
(-0.847) & (2.344) & (2.415) & (-0.952) & (-3.53) & (-4.415) \\
\end{array}
\]
\[ \text{ADJ } R^2 = 0.69 \quad \text{AR(1): } F(1, 25) = 0.996 \quad \text{RESET: } F(1, 25) = 1.125 \]
\[ B-J: \chi^2 = 4.821 \quad \text{ARCH(1): } F(1, 25) = 0.600 \quad \text{CHOW: } F(4, 22) = 0.589 \]
\[ \text{PHILLIPS } = -4.65 \]

\[ I/Y = 0.0689 + 2132YG + 0.4385FSY - 0.1176XM - 0.00072GD + 0.0017EXP \]
\[ \Delta(I/Y) = -0.0015 + 0.1489\Delta YG + 0.2974\Delta FSY - 0.01422\Delta XM - 0.00004\Delta GD \]
\[
\begin{array}{cccc}
-0.271 & 2.067 & 3.423 & -1.806 & -0.949 \\
(-0.271) & (2.067) & (3.423) & (-1.806) & (-0.949) \\
\end{array}
\]
\[ +0.006\text{EXP} - 0.80688RES(-1) \]
\[
\begin{array}{cccc}
(1.372) & & (-4.32) & & \\
(1.372) & & & & \\
\end{array}
\]
\[ \text{ADJ } R^2 = 0.55 \quad \text{AR(1): } F(1, 25) = 1.308 \quad \text{RESET: } F(1, 25) = 0.065 \]
\[ B-J: \chi^2 = 2.189 \quad \text{ARCH(1): } F(1, 25) = 1.268 \quad \text{CHOW: } F(4, 22) = 0.510 \]
\[ \text{PHILLIPS } = -5.16 \]
These results indicate that a larger degree of misalignment and a wider spread between the official and the blackmarket rate create disincentives for savers\(^3\) and investors who perhaps resort to capital flight as a means of protecting their wealth. However the negative impact of financial repression through the spread between the official and the blackmarket rate is insignificant in the short run, while that of exchange rate misalignment is almost significant at the 5 percent level.

\(^3\) See Section 5.4.6 in Chapter 5
6.4 Conclusions
A summary of the empirical results, thus far, is presented in Table 6.2 together with some comments.

<table>
<thead>
<tr>
<th>Proxy</th>
<th>Short Run</th>
<th>Long Run</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Real Interest Rate</td>
<td>Actual</td>
<td>Expected</td>
<td>Actual</td>
</tr>
<tr>
<td>(2) Dummy Variable</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>(1, when moderately negative)</td>
<td></td>
<td></td>
<td>(1, when severely negative)</td>
</tr>
<tr>
<td>(3) Required Reserves</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(4) Inflation</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>(5) Foreign-Domestic Interest Rate</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Differential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Proxy for the overvaluation</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>of the currency</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.1
Summary table of financial repression
Proxies for private and aggregate investment
In Tables 6.2 to 6.6, Summary Tables of the signs of the coefficients in both the long-run and short-run models are presented. The numbering of the proxy are in accordance with the presentation of the empirical results in Section 6.3, for example, Proxy One represents the model that incorporate the interest rate, Proxy Two the Dummy Variable, Proxy Three, the Commercial Banks’ Reserve and so on.

<table>
<thead>
<tr>
<th>Proxy</th>
<th>YP</th>
<th>YG</th>
<th>FR</th>
<th>IG</th>
<th>FS</th>
<th>GD</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two⁴</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six(a)</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six(b)</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.2
Summary table of coefficient signs
Long run models for private investment

<table>
<thead>
<tr>
<th>Proxy</th>
<th>YP</th>
<th>YG</th>
<th>FR</th>
<th>IG</th>
<th>FS/FSY</th>
<th>GD</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Two⁵</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six(a)</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Six(b)</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.3
Summary table of coefficient signs
Short run models for private investment

⁴Represents the dummy variable: one when moderately negative.

⁵Represents the dummy variable: one when severely negative.
### Table 6.4
Summary table of coefficient signs
Long run models for aggregate investment

<table>
<thead>
<tr>
<th>Proxy</th>
<th>YP</th>
<th>YG</th>
<th>FR</th>
<th>EXP</th>
<th>FS/FSY</th>
<th>GED</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Two(^6)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Six(a)</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Six(b)</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Table 6.5
Summary table of coefficient signs
Short run models for aggregate investment

<table>
<thead>
<tr>
<th>Proxy</th>
<th>YP</th>
<th>YG</th>
<th>FR</th>
<th>EXP</th>
<th>FS/FSY</th>
<th>GED</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Two(^7)</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td>+</td>
<td>+</td>
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</tr>
<tr>
<td>Five</td>
<td>+</td>
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<td>-</td>
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</tr>
<tr>
<td>Six(a)</td>
<td>+</td>
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</tr>
<tr>
<td>Six(b)</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

\(^6\)Represents the dummy variable: one when moderately negative.

\(^7\)Represents the dummy variable: one when severely negative.
The evidence is mixed, while the real interest rate and the inflation rate cast doubts on the potential of liberalisation, the reserve ratio, the foreign-domestic real interest rate differential, exchange rate misalignment and the difference between the official and the blackmarket rate indicate that there is some benefit to be derived. These results are reflected in those that were found earlier in Chapter Five. While lower levels of financial repression through low real interest rates and high inflation did not contribute to reducing saving rate, repression measured through other proxies was found to have a negative impact. With respect to the result for the real interest rate and inflation the coefficients in the short-run (for both saving and investment models) are significant at the 10 percent level.

It is important to examine the significance level and the coefficient size of the financial repression variable for those models in which liberalisation is the appropriate policy prescription (the reserve ratio, the foreign-domestic real interest rate differential, exchange rate misalignment and the difference between the official and the blackmarket). Not only are the coefficients small, but only in one instance is the relevant variable significant at the 10 percent level in the short-run (exchange rate misalignment). A similar pattern of the significance level of the financial repression proxies are also found in Chapter Five (in the models that examined saving rates). In the later the foreign-domestic interest rate difference is the only significant financial repression variable in the short run.

These results suggest that while the financial repression hypothesis cannot be rejected, uncritical acceptance is impossible. What is being inferred is that some degree of financial repression is acceptable in an economy (this is analogous to the view that a little inflation is not necessarily bad). This inference has been suggested in Proxy Two whereby a dummy variable is adopted to measure financial repression. For both savings and investment models the coefficient of the financial repression proxy only became negative when it was redefined to incorporate severely negative real interest rates. Based on the empirical result thus far, a low level of financial repression appear to be not harmful (on savings and investment) while the early theorists claimed that any level of financial repression should be avoided.

An interesting aspect is the extension of the financial repression theory to incorporate the exchange rate developments and developments in the foreign financial market. These result provide support not just for liberalisation, but liberalisation which reduces the gap between prices in the domestic economy and the foreign economy. As suggested earlier, a possible reason while increases in the real rate were unsuccessful in mobilising savings and stimulating higher investment rates is that
such increases did not alter the gaps between domestic and foreign indicators. Misalignment of the exchange rate should be reduced together with an attempt to lessen the spread between the official and the blackmarket rate. Both set of results (for savings and investment) illustrate some need for a devaluation in the Trinidad and Tobago economy.

The results for the other variables incorporated in the models presented no surprise. The income variable exerted a positive influence on investment in both the long-run and short-run. Foreign savings contributed to private and aggregate domestic investment, and its impact in the short run is statistically significant. Government investment crowded out private investment in both the long run and the short run. In the latter government investment is significantly negative. This suggests that both the private and public sectors competed for the same resources or the same market.

External debt was also detrimental to the investment process in the long-run. Over the short run its impact was positive but insignificant. This is perhaps because in the short run some proportion of external debt from international institutions or foreign firms were channelled towards facilitating investment, while in the long run debt repayments and obligations represented an additional burdens on the profits of the firms and affected the amount of funds that could be reinvested. Government external debt, instead of easing the problems in the Trinidad and Tobago economy exacerbated them as indicated by the negative coefficients. Credit to the private sector had a negative impact, albeit insignificant. Where included the export variable was positive, with a significant influence in Proxy Two. There were no inconsistencies between the long-run and the short-run with respect to these results.
CHAPTER SEVEN

Financial Repression and the Rate of Economic Growth

7.1 Introduction

The empirical results obtained from our earlier estimation of savings and investment models for Trinidad and Tobago suggest that the impact of financial repression on savings and investment is not unambiguous. When the proxy of financial repression is restricted to express distortions created by the government via the monetary sector the results are mixed. Higher real interest rates and hence lower inflation rates do not stimulate additional savings. The implications of the commercial reserves proxy and the dummy variable leads suggest the contrary. Furthermore, when the proxy for financial repression is redefined to incorporate the external sector, there is a clear indication that less distortions in the sector would contribute to higher savings and investment rates. In this section of the research an attempt is made to explore the impact of financial repression on the growth process in Trinidad and Tobago.

Unfortunately the growth performance of developing countries over the seventies and eighties as a whole have been rather disappointing. One way of creating a better environment for economic expansion is the removal of distortions that inhibit the growth process. Financial repression has already been cited as a prevalent source of price distortion in many developing countries (See Fry, 1978, 1980; Galbis, 1982; Gonsalves-Vega, 1982; Leite and Makonen, 1986). In an attempt to engender growth, economic policies are often geared towards the elimination or reduction of price distortions. This may be in the form of higher interest rates, a the reduction in the inflation rate, a narrowing of the gap between the domestic and foreign interest rate or reducing the degree of exchange rate misalignment. According to the McKinnon-Shaw hypothesis the removal of price distortions promotes economic growth. This occurs through three channels. The most immediate is that higher interest rates raise domestic savings and increases the supply of investible resources. Secondly, the removal of distortions (in the forms of ceilings) allows the financial sector to mobilise resources that are not otherwise available. Lastly, financial repression is associated with an inefficient allocation of resources because of its rationing procedures and the associated potential for corrupt practises. The removal of market distortion eliminates the need for rationing and hence improves the allocation of resources.
Economic Growth in developing countries depends to a large extent on export receipts and import expenditures. Exports should be competitive and imports be as low as possible. Hence it is essential that any obstacles which prevent additional exports or encourage too many unnecessary imports be eliminated. Our earlier discussion, in terms of the definition of financial repression shows a possible extension to the external sector and consequently price distortion therein may be one source of the problem. For example, if the exchange rate is overvalued, it increases the price of exportables and makes the price of importables more attractive. Repression in this form implies that the competitiveness of exports is reduced and total imports are increased. In other words, the exchange rate, which is administratively fixed below the equilibrium level, creates a situation where balance of payments deficits become very likely. This implies negative domestic savings as the excess of imports over exports is reflected as an excess of planned investment over actual savings.

In tandem with the ideas of the financial repressionists, with respect to the financial sector, economic growth can be stimulated when there is a reduction of distortion in the external sector. In the same way that rising interest rates can produce an increase in the supply of savings, a devaluation can be expected to increase the supply of foreign exchange and decrease the need for rationing and the subsequent misallocation of scarce foreign reserves. For example, the tendency to under-invoice exports and over-invoice imports may be reduced, foreign reserves will increase and there is less need for rationing.

Most developing countries export goods which have inelastic demand. If the price of a particular good with an inelastic demand is increased in all the countries which export this good, then export receipts of these countries would increase. However, if the price of the good was to be increased in one country, its export earnings would not necessarily increase despite its inelastic demand. This is because each developing country holds a very small percentage of the world market and importers can easily switch to another source and obtain a similar good. It is important that the exchange rate is not excessively distorted; that is, overvalued or undervalued because of the nature of its export goods.

In developing countries there is a greater tendency for exchange rate to be overvalued rather than undervalued, mainly because of direct government action. Developing countries import large amounts of capital, machinery and intermediate goods necessary for the production process as well as consumption goods. Governments
choose to keep import expenditure as low as possible by pursuing an overvalued exchange rate policy.

7.2 The Growth Model
The role of financial repression in economic growth is analysed within the framework of a straightforward production function in which real output is a function of the stock of capital (K) and labour (L).

\[ Y = f(K, L) \]  \hspace{1cm} (7.1)

Total differentiation gives:

\[ dY = \frac{\partial Y}{\partial K} dK + \frac{\partial Y}{\partial L} dL \]  \hspace{1cm} (7.2)

Dividing by \( Y \)

\[ \frac{dY}{Y} = \frac{\partial Y}{\partial K} \frac{dK}{Y} + \frac{\partial Y}{\partial L} \frac{dL}{Y} \]  \hspace{1cm} (7.3)

Equation (7.3) can then be manipulated to give the marginal productivity of capital and the elasticity of output with respect to labour:

\[ \frac{dY}{Y} = \left[ \frac{\partial Y}{\partial K} \right] \frac{dK}{Y} + \left[ \frac{\partial Y}{\partial L} \right] \frac{dL}{Y} \]  \hspace{1cm} (7.4)

or in terms of the coefficients to be estimated by regression analysis, taking \( dK = I \)

\[ YG = \alpha_1 IY + \alpha_2 LG \]  \hspace{1cm} (7.5)

where \( YG = \frac{dY}{Y}, \ LG = \frac{dL}{L} \), \( \alpha_1 = \frac{\partial Y}{\partial K} \) and \( \alpha_2 = \frac{\partial Y}{\partial L} \).

Alternatively (7.4) can be written as

\[ \frac{dY}{Y} = \left[ \frac{\partial Y}{\partial K} \right] \frac{dK}{KY} + \left[ \frac{\partial Y}{\partial L} \right] \frac{dL}{YL} \]  \hspace{1cm} (7.6)

which implies

\[ YG = \beta_1 K + \beta_2 L \]  \hspace{1cm} (7.7)
\[ \beta_1 = \frac{\partial Y}{\partial K} \frac{dK}{KY}; \quad \beta_2 = \frac{\partial Y}{\partial L} \frac{dL}{LY} \]

\( \beta_1 \) and \( \beta_2 \) can be rewritten to include the original coefficients i.e. the marginal productivity of capital \( (\alpha_1) \), and the elasticity of output with respect to savings \( (\alpha_2) \) which can then be estimated if \( I, K, Y, \) and \( L \) are known.

\[ \beta_1 = \alpha_1 \frac{I}{KY}, \quad \text{and} \quad \beta_2 = \frac{\alpha_2}{L} \frac{dL}{L}. \]

Many researchers choose to adopt a more general specification whereby determinants of growth other than capital and labour are included in the model (as in the specification to be estimated). For example, proponents of export-led growth argue that the growth of exports plays an important role in the growth process in developing countries. Similar importance may also be attached to foreign savings and external debt or aid. If properly utilised they can lead to the development of infrastructure, transport - internally and to foreign countries, communication, etc., which in turn can complement current production of goods and services and encourage the production of new goods and services. They can also directly cause the birth of new productive activities, both in the private or government sector. Human capital is often treated in a similar manner. For example, in the agricultural sector techniques such as tree grafting, land harrowing and irrigation may have a large impact on agricultural output. In the industrial sector, new techniques and proper utilisation of equipment is equally important.

These effects can be included in the growth model by adding explanatory variables. The variables \( K \), and \( L \) in the simple production function were adopted for simplicity. They can be substituted by other variables. The growth model which will be estimated in this chapter is of the following form:

\[ YG = a_0 + a_1 DR_{t-1} + a_2 X_{t-1} + a_3 FR_{t-1} + a_4 GD_{t-1} + a_5 FSY_{t-1} \text{ } \tag{7.8} \]

where \( YG \) is the real growth rate of income, \( DR \) is the dependency ratio, \( FR \) is the financial repression proxy, \( GD \) is government external debt, \( FSY \) is the foreign

\[ \frac{R_Y - R_{Y_{t-1}}}{R_{Y_{t-1}}} \]

where \( R_Y \) is the real income level.
savings ratio, \( X \) represents a some definition of foreign exchange receipts, either, the overall surplus on the balance of payments (\( ROS \)), the total level of exports (\( EXP \)), or the level of exports to developed countries (\( XDC \)). All appropriate variables are deflated using the gross domestic product deflator.

The coefficients in the growth model are similar to those above in the simple two variable production function:

\[
\begin{align*}
    a_1 &= \left( \frac{\partial YG}{\partial DR_{t-1}} \frac{dDR_{t-1}}{(DR_{t-1})YG} \right) < 0; \\
    a_2 &= \left( \frac{\partial YG}{\partial X_{t-1}} \frac{dX_{t-1}}{(X_{t-1})YG} \right) > 0; \\
    a_3 &= \left( \frac{\partial YG}{\partial FR_{t-1}} \frac{dFR_{t-1}}{(FR_{t-1})YG} \right) < 0; \\
    a_4 &= \left( \frac{\partial YG}{\partial GD_{t-1}} \frac{dGD_{t-1}}{(GD_{t-1})YG} \right) > 0; \\
    a_5 &= \left( \frac{\partial YG}{\partial FS_{t-1}} \frac{dFS_{t-1}}{(FS_{t-1})YG} \right) > 0.
\end{align*}
\]

7.3 Explanatory Variables
7.3.1 Financial Repression Proxies
Six proxies of financial repression are defined, as in the chapters on savings and investment:

(1) The Real Interest Rate
(2) A Dummy Variable
(3) The Reserve Requirement Ratio
(4) The Inflation Rate
(5) The Domestic-Foreign Interest Rate Differential
(6) A variable to represent the deviation of the actual exchange rate from its equilibrium level.

A discussion of the each proxy can be found in Chapter Four. The impact of each proxy on growth will be estimated. Based on the theory one would expect financial repression to have a negative influence on the growth rate of the economy since it erodes savings and discourages investment. A lowering of financial repression increases the supply of investible resources as well as the quality and quantity of investment and thus economic growth\(^2\).

\(^2\)See Chapter Two (Section 2.2) for a detailed discussion.
The Neoclassical growth model with endogenous technical change may be employed to explain economic growth. An application of this model to tailor the needs and achieve the aims of the financial repression theory must be based on the assumption that a rise in the interest rate increases the rate of capital accumulation. A rise in the interest rate increases savings and shifts the KK (the relationship between the rate of capital accumulation and the capital labour ratio) curve rightwards. A series of dynamic adjustment follows resulting in higher growth rate of output.

7.3.2 Dependency Ratio

Many studies theoretically and empirically have focused on the relationship between population growth and economic growth. The general feeling is that faster growth rates of population is associated with slower growth and development of an economy. An increasing number of countries have implemented policies to curb or reduce their population growth. This is mainly true for developing countries. Coale and Hoover (1958) suggests three possible aspects of population that may be examined when looking the effect of population growth on the growth of per capita income: size of the population; its growth rate and its age distribution. The first issue is complicated and depends on the available techniques of production and hence the skills which the population possesses if they are to implement the various techniques.

While Leff (1969) posited an inverse relationship between savings and dependency that Adams (1976) argued that it is possible that an increase in the family size or the dependency ratio to have a positive influence on productivity and growth. According to Adams, "......it is not at all obvious why a negative relationship between these variables is to be accepted." Kelly (1973, 1975, 1987) not only supports this view but, like Gupta also expresses concern that the savings/investment/growth-population relationship may not be quantitatively important (see Chapter Three). Children may encourage capital accumulation in certain forms of assets, for example education or the amassing of estates for posterity (moreso if the bequest motive is strong), and lastly they may contribute directly to household income. This is especially true for developing countries where there is a large agrarian society. Children contribute directly to farm productivity and output at early ages, for example six, or seven. This contribution can exceed any possible negative impact of additional family members on output. Larger farm families can be associated with increased farm output. This

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3 See Otani and Villanueva (1989), Section II, page 313 for a detailed discussion.
may not be true for their counterparts in developed countries where children do not actively contribute to production.

A population with a high birth rate increases the demand for youth oriented programmes, while a population with a low birth rate increase the demand for elderly facilities. If the former are largely considered as investment since it can have a positive impact on work productivity, and the latter as consumption since it has a smaller impact on worker productivity, then a population with a low birth rate may not necessarily have a positive influence on investment rate as believed by Coale, Hoover, Demeny, Leff and others. Kelly (1973) writes "that at certain stages of economic development the negative saving rate of the elderly could well be greater than for those who have not yet entered the labour force." Hence there is no reason why low birth rates must be associated with higher growth rates.

Another argument put forward by proponents of a positive relationship between population growth rates and output stems from the additional demand created from a bigger population. In this instance a lack of aggregate demand acts as a barrier to economic growth. A rise in the birth rate fills the gap and provides the additional demand and serves as the stimulus to increased output. However this may not be entirely valid for low-income countries. A rapid rate of growth in population may not necessarily provide the stimulus for economic growth, since there is no apparent way for a larger population to be translated into higher consumption of large proportion or higher returns to capital. According to Coale and Hoover (1958) most families do not possess the capability to expand their consumption, but instead spread meagre income over a larger number. This can be paralleled with Gupta's (1976) analysis where he suggests that individuals are only sharing poverty.

The literature on the relationship between dependency and savings-investment-growth rates seems to indicate that no generalisation can be made. To do so would be fallacious. The answer to the issue lies in the empirics. Perhaps one generalisation which can be made is that the stage of economic development of a country is important in influencing the final result. Even with developing countries no general consensus can be achieved. The reason for this is simple-country specific factors determine the final relationship between dependency ratios and economic indicators.
7.3.3 Engine of Growth
William A. Lewis (1980) writes

"For the past hundred years the rate of growth of output in the developing world has depended on the rate of growth of output in the developed world." (page 555)

The principal link through which developed countries (DCs) influence the growth rate of the less developed countries (LDCs) is trade. As the DCs undergo increasing output levels, their imports respond correspondingly and exports from LDCs increase. The engine of growth of developing countries can be interpreted as the level of imports of the developed countries from the developing countries, that is, exports from developing countries. Belassa (1978), Tyler (1981), Ram (1987), Cohen (1990), Otani and Villanueva (1990), Warman and Thirlwall (1994), used regression analysis in an attempt to measure the impact of exports on growth performance. In all cases there was a substantial positive effect. Yaghmaian (1994) challenges the results of the empirical literature in support of the neo-classical theory of export-led growth and suggests an alternative: both exports and economic growth are determined by prior economic development and structural change. His result indicate a significant positive association between output and exports when population statistic was used as the appropriate labour variable. However when employment is substituted for population there is no statistical support for export-led growth theory.

In Trinidad the average percentage of exports to developed countries (European and North American) was over 70 percent. When we consider that without exports to developed countries, "income" (through exports) earned by the Trinidad would have been reduced by such a large amount, the importance of this factor is enabling the purchase of essential imports becomes obvious. This trend is true for most developing countries, developed countries account for more than two-thirds of the total exports. Less than a quarter of Trinidad and Tobago's export go to other developing countries.

Because the supply of food is inelastic in many developing countries it is virtually impossible to expand food supply to facilitate extra demand in the short-run. Although Trinidad possesses raw materials, technical expertise and relevant equipment necessary for the production process must be imported. Without these essential inputs production would be lacking and there would be a shortfall in investment and growth. Exports receipts are important for consumption and investment purposes.
Export revenue is important to the extent that it is channelled towards the investment process. Over the last decade there has been a tendency for developing countries to apportion increasing amounts of exports revenues to the servicing of their debts. Because of the growing political and economic instability in some developing countries capital flight has become a serious problem. The result is the implementation of various strategies in an attempt to keep foreign exchange within the country and to attract funds foreign funds. Not only has the proportion of export revenue direct to debt repayment increased but export performance has deteriorated. Many reasons have been offered as an explanation: nature of exports of LDCs; commodity concentration of exports; low demand elasticity of export products; market concentration; high costs of production; cheaper substitutes with lower transport costs.

It has been estimated that a one percent increase in developed country incomes will normally raise imports of foodstuff from LDCs by 0.6 percent, agricultural raw materials by 0.5 percent petroleum products and other fuels by 2.4 percent and manufacturers by 1.9 percent. Since most developing export the first two products, it can be seen why developing countries incomes grow relatively slowly. While the demand for manufactures (which are mostly produced by DCs) grow fairly quickly Todaro (1981). Trinidad can perhaps be seen as an exception since petroleum is the dominant export accounting for sixty or seventy percent, over most of the period under study. In the seventies and early eighties export receipts increased mainly because of the petroleum sector. However, this asset has turned into something of a liability because of the economy’s almost total dependence on the oil sector, at the expense of the agricultural, manufacturing and other sectors.

The engine of growth conceived as exports to the developed world has raised two important issues (Lewis, 1980): can LDCs maintain fast growth rates in spite of declining growth rates of the DCs and is it desirable that LDCs development depend on exports to the DCs. As a possible solution Lewis suggests an acceleration of LDCs' trade with each other\(^4\). According to Lewis the dependence on food and

\(^4\) More commonly known as south-to-south trade (see Lewis, 1980).
manufactures from DCs could be thrown off quickly and the others on a more gradual basis\(^5\).

The importance of the export sector in developing countries has been highlighted for several reasons (Otani and Villanueva, 1990):

1. It serves as a vehicle for the transfer of technology via the importation of capital goods and the development of efficient and internationally competitive management.
2. It enhances the capacity to service the external debt. By improving creditworthiness it induces higher flows of foreign credit that makes possible a higher rate of investment.

7.3.4 External Debt

Trinidad debt levels were relatively low and easily manageable until the late eighties. Debt levels escalated in the late eighties due in part to increasing demand on government's domestic expenditure, high interest rates, declining oil prices and a world recession. Between the years 1984 to 1989 Trinidad's debt service ratio quadrupled from 5.5 percent to 22 percent. The effects of debt has been widely documented Cohen (1990), Borenstein (1991), Warner (1992), Kaminarises and Nissan (1993). The empirical results are mixed. In Borenstein's study on the Philippines, he found that debt had a negative and significant impact on investment. While Cohen finds negative and insignificant coefficient. In Warner's study he examines whether equations without any debt related information can forecast the investment declines\(^6\). The idea is that these forecasts should not track investment during the debt crisis period if the debt crisis is important. However they should track investment if it is not. The results indicate that simple forecasts without debt crisis

\(^5\)South-to-south trad has unfortunately been not very successful. With respect to the Caribbean, an attempt was made in the sixties with the formation of the Caribbean Free Trade Association (CARIFTA) which soon disintegrated. More recently the Caribbean Community has been formed (CARICOM). Periods of prosperity and slump should ideally be the consequence of self-generated conditions and not rooted in external causes. The Caribbean, and indeed most developing countries has not achieved this status. There is still the need to import essential commodities and hence to export. The destination in most cases is the developed world. To this end it represents the "engine of growth."

\(^6\) The model to be estimated is of the form:

\[ I/Y = f(I/Y_{-1}, P, r, gw) \]

where I is national investment, Y is GDP, P is the terms of trade, r is the ten-year U.S. treasury bill rate and gw is the percentage in an industrial production index for developed countries.
effects explain much of the decline. Additionally Warner added a debt crisis dummy to some of his models which had a positive and significant coefficient.

In the seventies and early eighties Trinidad benefited from rising oil prices. Imports level rose, the revenues are in the most part spent on "unproductive" expenditure. Only a small percentage found its way back into productive investment. Trinidad's economy adjusted to perpetual net capital inflows. Production remained dependent on imported inputs. Consumption also had a high import content. This was by no means restricted to the luxury tastes of the upper income classes.

The oil boom was coming to an end in the early eighties. The economy's engine of growth was decelerating and alternative plans to compensate for the coming reduction in export receipts were still lacking. The shortfall in export revenues was not met by increasing exports of other sectors. Furthermore, the mid-eighties a decline in their growth rate to under three percent, which was accompanied by a continued deterioration in the purchasing power of LDCs' exports. Trinidad began to become trapped into a pattern of production and consumption which required high level of imports in excess of export earnings. The gap between receipts and expenditures had to be met. As a result external funds were being channelled into the economy to sustain production. Two Stand-by arrangements were made with the International Monetary Fund in 1989 and 1990. As well as a structural adjustment loan with the World Bank in 1990.

The impact of debt on an economy's growth is ambiguous. It can assist in economic growth or it can further debilitate the economy. This final effect depends on the use to which it is put. If channelled into projects such as communication or improving the general infrastructure of the economy, the gains may be positive. Unfortunately in many developing countries debt assistance goes to making up for the shortfall in consumption. An accurate picture of the relationship between a debt variable and growth may not be possible for the economy of Trinidad and Tobago. This is because debt levels escalated in the later years in our survey (post 1985).

7.3.5 Other Variables
Human capital may also be used as an explanatory variable in estimating growth models. Romer (1990) claims that human capital is the key input to the research sector which generates new products and/or ideas that underlie the technological progress. As a consequence countries with greater stocks of human capital experience a more rapid rate of growth of new goods and tend to grow faster. Nelson
and Phelps (1966) suggests that if a country has a larger stock of human capital it becomes easier for that country to absorb the new products or ideas from other countries.

In developing countries both capital equipment and technical expertise in the form of foreign consultants are imported to operate the machinery. Increases in human capital can lead to a fall in imports of this form and can reduce future dependency. In agriculture, human capital can be especially productive. New techniques and methods can have an enormous impact on agricultural output. Developing countries sometimes suffer from what is known as the "brain drain" whereby human capital migrate to other countries, mainly developed ones.

Barro (1991) uses primary and secondary school-enrolment rates as proxies for human capital. Other proxies which can be employed are student-teacher ratios and the adult literacy rate. Unfortunately because of lack of data a human capital variable is excluded from the growth model for Trinidad and Tobago. In Barro's models, the result indicate that per capita growth rates is positively related to the proxies for human capital. He suggests that poor countries tend to catch up with rich countries if the poor countries have high human capital per person but not otherwise. Otani and Villanueva (1990) includes budgetary allocation to improve human capital as an explanatory variable. This is represented by the proportion of per capita government revenue spent on education. The empirical results suggest that the development of human resources play an important role in economic growth, contributing 1 percent annually to the average per capita growth rate of output in developing countries.

A variable to represent foreign savings is also included in some growth models. When included in the savings model it acted as a substitute for domestic savings and contributed to raising the investment rate in Trinidad and Tobago economy. As a result it is expected to have a positive influence on growth rates. Government savings as an explanatory variable is included in some models. It is expected to have a positive influence on growth (Warman and Thirlwall, 1994). Some researchers have included the domestic savings rate (Otani and Villanueva, 1990; Arestis and Demiatriades, 1991).
7.4 Empirical Results and Implications for Policy

The results for the various models are presented in a format similar to those of Chapter Five and Six. The first regression in each set of results represent the long-run model. This is followed by the short run regression which only includes stationary variables. Phillips (PHILLIPS) is the test for the presence of a unit root in the residual of the long run model. All models are estimated in levels. Res(-1) incorporated in the short run models, represents the lagged residual from the long run regression. All variables in the long run model are integrated of order one. The explanatory variable in the estimated model are lagged once (see footnote 1).

The stationary variable in the short run models, are the first differences. \( \Delta \) represents the first difference operator. 't' statistics are in parenthesis. The diagnostics for the short run model are presented immediately below the 't' statistics. Table 5.1 in Chapter Five gives a guide to the abbreviation which is used.

Tables 8.3 and 8.4 are the results when the dummy variables are used as proxies. In the former a dummy of one represents moderately negative rates, while in the latter a dummy of one represents severely negative rates. The cointegration methodology is not applicable to these models, hence there is no distinction between the long and short-run and testing for unit roots (the Phillips’ test is not relevant in these model specifications). The estimates were obtained using the standard econometric methodology.

Based on the diagnostics the growth models for each of the financial repression proxy is acceptable. As expected the goodness of fit is generally lower than those for the savings and investment models. Cointegrating vectors were found for each proxy. The stationarity of the residual retrieved from the long-run model is indicated by the Phillips test. However, each model is specified differently in order to ensure that is diagnostically acceptable. The error correction terms are negative and highly significant in all model. Furthermore there is no evidence of instability as they are all less than the modulus of unity.
4.1 Proxy One: The Real Interest Rate

The results for the first proxy of financial repression are as follows:

\[ YG = -0.0456 + 0.0002GS + 0.0315DR + 0.0016R + 0.00022ROS \]

\[ \Delta YG = -0.0012 + 0.00017\Delta GS - 0.0471\Delta DR - 0.00033\Delta R + 0.00012\Delta ROS - 0.9230\text{RES}(-1) \]

\[
\begin{array}{ccc}
(-0.2287) & (2.531) & (-2.881) & (-0.0921) & (2.025) & (-3.017)
\end{array}
\]

\[ \text{ADJR}^2 = 0.64 \quad \text{AR}(1): F(1,25) = 0.8126 \quad \text{RESET:} F(1,25) = 2.9631 \]

\[ B-J: \chi^2 = 0.242 \quad \text{ARCH}(1): F(1,25) = 0.031 \quad \text{CHOW:} F(4,22) = 0.3813 \]

PHILLIPS = -5.27

In the growth model the influence of the real interest rate is positive in the long-run and negative and insignificant in the short-run. In terms of their directional behaviour they are inconsistent with those found previously. In the savings and investment models (Chapter Five and Six) the real deposit rate exerts a negative influence in the long-run and the short-run. Despite being inconsistent with previous findings, these results in the long run indicate that a lower degree of financial repression increases the growth rate. That is, the McKinnon-Shaw hypothesis cannot be rejected.

7.4.2 Proxy One: Dummy Variables

The results for the dummy variables are presented below. In the first set of results a dummy of one represents moderately negative rates, while in the latter a dummy of one represents severely negative rates.

\[ YG = -0.0604 + 0.00027GS + 0.00692D1 + 0.2249FSY + 0.00019ROS \]

\[
\begin{array}{ccc}
(-0.660) & (1.468) & (0.404) & (1.629) & (2.863)
\end{array}
\]

\[ \text{ADJR}^2 = 0.62 \quad \text{AR}(1): F(1,25) = 1.209 \quad \text{RESET:} F(1,25) = 0.207 \]

\[ B-J: \chi^2 = 1.2144 \quad \text{ARCH}(1): F(1,25) = 0.194 \quad \text{CHOW:} F(4,22) = 0.546 \]

\[ YG = -0.1089 + 0.00035GS - 0.0138D2 + 0.3091FSY + 0.00021ROS \]

\[
\begin{array}{ccc}
(-1.198) & (1.553) & (-0.799) & (2.382) & (2.924)
\end{array}
\]

\[ \text{ADJR}^2 = 0.64 \quad \text{AR}(1): F(1,25) = 1.213 \quad \text{RESET:} F(1,25) = 0.531 \]

\[ B-J: \chi^2 = 0.927 \quad \text{ARCH}(1): F(1,25) = 0.057 \quad \text{CHOW:} F(4,22) = 0.206 \]
The results for the dummy variables are as expected. Where the dummy is one for moderately negative real interest rates the coefficient is positive but insignificant, however in those cases where the dummy is redefined as one for severely negative rates (less than minus six percent) the coefficient becomes negative, and still insignificant. Hence while moderately negative has a positive effect on growth rates, severely negative rates is a disincentive for growth. Similar results have been found in both the savings and investment models.

### 7.4.3 Proxy Three: Commercial Bank Reserve Requirement

The third proxy for financial repression is the Commercial Bank Reserve Requirement. The result are as follows:

\[
YG = -0.03871 -0.00061GD +0.07139DR -0.00018CR +0.00015ROS
\]

\[
\Delta YG = -0.0028 -0.00005\Delta GD -0.0714\Delta DR -0.00054\Delta CR +0.0008\Delta ROS -0.9332\Delta RES(-1)
\]

\[
\text{(-0.474)} \quad \text{(-1.358)} \quad \text{(-1.619)} \quad \text{(-1.0710)} \quad \text{(1.852)} \quad \text{(-4.283)}
\]

\[
\text{ADJ R}^2 = 0.60 \quad \text{AR(1): } X_i^2 = 1.6144 \quad \text{RESET: } F(1,25) = 1.062
\]

\[
\text{B-J: } \chi_i^2 = 0.705 \quad \text{ARCH(1): } X_i^2 = 0.276 \quad \text{CHOW: } F(4,22) = 0.123
\]

\[
\text{PHILLIPS = -4.97}
\]

As a financial repression proxy commercial bank reserves exerts a negative influence on economic growth both in the long-run and short-run, although its effect in the latter is insignificant. This long-run relationship is consistent with the long-run relationship found in the model which incorporate the interest rate. Because interest rate and commercial reserves are theoretically inversely related their impact on economic growth should be the opposite. However, while this relationship is valid in the growth model, it is not valid in the savings and investment models (Chapters 5 and 6, respectively). In the latter both proxies (the interest rate and commercial banks' reserve) had a negative effect.

Based on the results in this chapter a higher degree of financial repression through higher reserves has an adverse impact on economic growth. Once again the theory of financial repression cannot be rejected and a reduction in the reserve ratio appears to be the appropriate policy prescription. With respect to commercial reserve proxy, this result has been consistent throughout the course of this research.
7.4.4 Proxy Four: The Rate of Inflation

The results of the models that incorporate inflation as the proxy for financial repression strengthen the above findings. They are presented below:

\[
\begin{align*}
YG &= -0.0256 +0.0572FSY -0.0072INF +0.0003ROS \\
\Delta YG &= -0.0013 +0.1442\Delta FSY -0.1139\Delta YG_{-1} +0.0011\Delta INF +0.00019\Delta ROS \\
B-J: \chi^2 &= 0.350 \\
\text{PD Phillips} &= -5.59
\end{align*}
\]

\[
(-0.199) (1.003) (0.618) (0.678) (3.595)
\]

\[
-0.9345RES(-1) \\
(-3.091)
\]

\[
\text{ADJ } R^2 = 0.58 \\
\text{AR(1): } F(1,25) = 0.826 \\
\text{B-J: } \chi^2 = 0.350 \\
\text{ARCH(1): } F(1,25) = 0.157 \\
\text{CHOW: } F(4,22) = 0.265 \\
\text{RESET: } F(1,25) = 3.170
\]

A inconsistency similar to the one found for proxy one exists in the model that includes the inflation variable. In the long-run growth model its influence is negative (positive in the savings and investment models) and positive in the short-run model. Although inconsistent with the earlier findings these results strengthen those of the interest rate within the framework of the growth specification (the real rate of interest and the rate of inflation are inversely related, hence if an increase in the growth rate, then the opposite should be true for inflation).

Moreover, these results provide empirical evidence to support the McKinnon-Shaw hypothesis of interest rate liberalisation at least in the long run. Although the coefficient signs (of the real interest rate and inflation) in the short run are not as expected, they are statistically insignificant.
7.4.5 Proxy Five: The Foreign-Domestic Interest Rate Differential

The foreign-domestic interest rate differential is the fifth proxy which is used to measure financial repression. The result are as follows:

\[
\begin{align*}
YG &= -0.0831 - 0.0001 GD - 0.0043 FD + 0.00021 GS + 0.0447 DR \\
\Delta YG &= -0.0024 - 0.00008 AGD - 0.1850 \Delta YG_{-1} + 0.0015 \Delta FD + 0.00026 \Delta GS - \\
&\quad -0.0083 \Delta DR - 0.9249 RES(-1) \\
\end{align*}
\]

\[
\begin{align*}
ADJ R^2 &= 0.62 & AR(1): F(1, 25) &= 1.57 & \text{RESET: } F(1, 25) &= 3.17 \\
B-J: \chi^2 &= 0.4210 & ARCH(1): F(1, 25) &= 0.858 & \text{CHOW: } F(4, 22) &= 0.2518 \\
& & PHILLIPS &= -4.98 \\
\end{align*}
\]

The larger the differential between the domestic and the foreign interest rate the greater is the reduction in the economy's growth rate in the long-run. In the short-run, there is a positive influence. However the coefficient is statistically insignificant. These results are similar to those found earlier in Chapters Five and Six, and reasons for the apparent conflict between the long-run and short-run have already been offered\(^7\).

7.4.6 Proxy Six: (a) The Official-Blackmarket Exchange Rate Difference

Overvaluation of the domestic currency is the final proxy of financial repression. In the first instance the results for the official-blackmarket exchange rate difference are presented followed by the second measure of overvaluation, exchange rate misalignment.

\[
\begin{align*}
YG &= -0.0705 + 0.0005 GS + 0.0415 DR - 0.0093 XD + 0.00022 ROS \\
\Delta YG &= -0.0018 + 0.00013 AGS - 0.0555 \Delta DR - 0.0175 \Delta XD + 0.00012 \Delta ROS - 0.9499 RES(-1) \\
\end{align*}
\]

\[
\begin{align*}
ADJ R^2 &= 0.58 & AR(1): F(1, 25) &= 0.8194 & \text{RESET: } F(1, 25) &= 3.845 \\
B-J: \chi^2 &= 0.4680 & ARCH(1): F(1, 25) &= 1.456 & \text{CHOW: } F(4, 22) &= 0.4148 \\
& & PHILLIPS &= -5.21 \\
\end{align*}
\]

\(^7\) See Chapter Five
Proxy Six: (b) Exchange Rate Misalignment

\[ YG = -0.0258\cdot GD + 0.0309\cdot DR - 0.2527\cdot XM + 0.0012\cdot ROS \]

\[ \Delta YG = -0.0052\cdot GD + 0.0143\cdot DR - 0.0312\cdot XM + 0.00061\cdot ROS - 0.8987\cdot RES(-1) \]

\[ (-0.1701) (-0.9670) (1.8114) (-0.3545) (2.672) (-3.963) \]

\[ \text{ADJ } R^2 = 0.52 \quad \text{AR}(1): F(1, 25) = 1.9431 \quad \text{RESET: } F(1, 25) = 1.643 \]

\[ B-J: \chi^2_2 = 1.853 \quad \text{ARCH}(1): F(1, 25) = 1.209 \quad \text{CHOW: } F(4, 22) = 0.2047 \]

\[ \text{PHILLIPS} = -5.01 \]

The result for proxy six is very interesting. It indicates that economic growth suffers as a country's currency becomes more misaligned and as the gap between the official and blackmarket rate increases. There seems to be a clear indication that sub-equilibrium prices in the external market should be avoided.

The exchange rate should reflect demand and supply conditions which in turn should reduce any incentive for illegal activities in foreign currency. However whether it would reduce the amount of capital flight debatable. Economic and political stability are key determinants of capital flight. Unfortunately these factors are not assured when a reduction in the misalignment of a country's currency occurs or when the gap between the official and blackmarket price lessens.

Similar results have also been found in the models of savings and investment. (Chapter Five and Six). Throughout the course of this research, the long-run evidence has been consistent with respect to proxy six. A devaluation in the Trinidad and Tobago's currency appear to be necessary for the mobilisation of savings, enhancement of investment and the promotion of economic growth.

One justification for the conflicting results between Chapter Five and the current chapter (for proxy one and four) stems form the substitutability between different types of savings. Landau (1969), Singh (1971) Weisskopf (1972) and others argue that foreign savings are not a complement, but a substitute, for domestic savings. Domestic consumption increases in response to an inflow of foreign capital, if income does not increase by an equivalent amount then domestic savings will decline. A

---

8 Subsequent to the period under study (1993) the Trinidad and Tobago dollar was allowed to float as the need for a reduction in overvaluation became more apparent. However to this date too short a time has elapsed to deduce whether the predicted positive impact has occurred.
bivariate model of domestic savings and foreign savings\(^9\) illustrate this inverse relationship. In the Trinidad and Tobago economy a fall in domestic savings appears to be accompanied by a rise in foreign savings, in other words, the latter picks up the slack and total savings (domestic plus foreign savings) is unaffected. Despite the decrease in level of domestic savings there is no corresponding reduction in the total level of resources which can be made available for investment and the growth process. A indication of the positive relationship between foreign savings and investment and growth is given by the empirical results for the investment model in Chapters Six and Seven and the estimates of the growth model in this chapter. Hence the negative relationship between the real deposit rate and savings ratio can perhaps be reconciled with the positive relationship between the real interest rate and economic growth because of the nature of foreign savings.

Although somewhat more contentious (especially for developing countries) it can be suggested that the rise in real domestic interest rates stimulates foreign savings\(^10\) because of the potential capital gains and thus expand the resource-base for investment. Foreign savings may, once again 'pick up the slack' in domestic savings because of movements in the interest rate and not only because of its substitutability with domestic savings. This point is a contentious one since it is widely believed that foreign capital inflows in developing countries respond less to capital gains prospect and more to social and political reasons. Assets in these countries are not perceived of as attractive substitutes for those in developed countries because of economic and political instabilities.

Another justification as to why such a reconciliation might be possible stems from the definition of savings. Domestic savings is highly aggregated, there is no discrimination between savings in non-productive and that in productive assets. This can be further specified as savings in physical assets (land or gold) or saving in financial assets, offered by financial intermediaries. For those economic agents who

\(^9\) OLS was used to estimate the model:  
\[ DS = 471.44 - 0.97481FS \]
\[ (9.006) (-5.024) \]
\[ R^2=0.457 \]

where DS is total real domestic savings and FS is real foreign savings. For every unit increase in foreign savings domestic savings decrease by 0.97. They are significantly negatively correlated.

\(^{10}\) OLS estimates of a bivariate model of the relationship between foreign savings and the domestic real interest rate yield:

\[ FSY = 0.1665 + 0.009247R \]
\[ (10.65) (4.589) \]
\[ R^2=0.413 \]

FSY is foreign savings ratio. Figures in parenthesis are 't' statistics. There is a positive relationship suggesting that higher domestic rates attracts foreign savings. But as suspected the coefficient is very small.
are interested in increasing their wealth, a rise in interest rate can produce a fall in non-productive assets as individuals choose to sell their land and gold, and a rise in the demand for financial assets (as the substitute financial assets for fixed assets). Total savings may be marginally affected or unaffected. However, the volume of resources which is available for investment has increased and consequently economic growth follows. If this line of thought is valid, then based on the empirical estimates obtained thus far, the fall in non-productive savings following a rise in the real interest rate should outweigh the rise in financial savings and hence the overall impact on aggregate savings is a negative one. Furthermore, the rise in financial savings is channelled through avenues which increases economic growth.

In developing countries, some asset-holders are not aware or motivated by movements in the interest rate and thus a small percentage of the population engage in asset-switching. While an interest rate increase may tempt some to switch their assets the majority do not, individuals are quite comfortable and satisfied to hold land and gold and to continue saving a fixed nominal amount in banks per period.

It is important to remember that the estimates in the savings and the growth models are concerned with different measurements. In the former the ratio of savings to income \((S/Y)\) is the dependent variable and in the latter the growth rate of income \([(Y_t - Y_{t-1})/Y_t]\) is the dependent variable\(^\text{11}\). When a bivariate model between growth and the real interest rate is estimated the coefficient of the real interest rate is negative\(^\text{12}\). These additional results provide some consistency with those from the savings and investment model.

In the investment models estimated, the real deposit rate was included as explanatory variable. It was found to have an inverse influence on the investment rate. Based on this, its influence on growth should also be negative. As noted earlier, movements in the deposit rate parallels the movement in the loan rate and consequently increases and decreases in the loan rate and the deposit rate, (although not equal) may be

\(^\text{11}\) Real Income (represented by the gross domestic product at constant prices) is integrated of order two and hence could not be considered when using the cointegration methodology to estimate the long run models. When a correlation coefficient was calculated between real income and the real interest rate, it was found to be negative (-0.67).

\(^\text{12}\) When growth is regressed on the real interest rate the long run estimates are:

\[ Y_g = 0.01348 - 0.000986 \Delta R \]

The appropriate short run model is:

\[ \Delta Y_g = 0.00085 - 0.001078 \Delta R - 0.38723 RES(-1) \]

\[ (-0.1289) \quad (-0.6195) \quad (-2.60) \]

\[ R^2=0.16 \quad \text{Het}=0.446 \quad \text{Reset}=0.4743 \quad \text{Chow}=0.1884 \quad \text{AR(1)}=1.4R \]
simultaneous. A rise in the deposit rate usually implies a rise in the loan rate in order to meet the additional expenses created by the higher deposit interest rate. The need for such an action is exacerbated if financial intermediaries have a limited means of increasing their income. Hence, this general movement is perhaps being picked up in the estimates for the investment model. The deposit rate reflects the user cost of capital or the cost in obtaining capital. There is the typical price-demand relationship. As the price of investible funds rise its demand falls. If this is true then there is no reason to expect growth to respond negatively to increases in interest rate simply because investment does.

An examination of the other explanatory variables in the growth model reveal no serious "surprises". Foreign savings has a positive influence on growth in the long-run and the short-run. The real overall surplus on the balance of payment and exports where included also assists in the growth process. In the short-run the dependency ratio is inversely related to growth while in the long-run its impact is positive. This is hardly surprising in developing countries where children play an important role as discussed earlier. Government savings contributed to increasing economic growth.

The results for government debt are mixed. In the short-run it is statistically insignificant. One reason as to why it may be negative in the short-run and positive in the long-run may attributed to a gestation period. Its takes time before funds are allocated and invested in projects and time for those projects to yield monetary gains. A negative long-run relationship suggest perhaps funds were not allocated in productive projects, or very little gains were accrued. It may also indicate that the funds were used for consumption rather than investment purposes and hence made no contribution to economic growth. Furthermore debt has interest repayments. If the debt incurred by the government was not spent productively, then interest payments present an additional burden on the country's resources and serve to debilitate the economy.
### 7.6 Conclusion

A summary of the empirical results, thus far, is presented in Table 7.2 together with some comments.

<table>
<thead>
<tr>
<th>Proxy</th>
<th>Short-run</th>
<th>Long-run</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Expected</td>
<td>Actual</td>
</tr>
<tr>
<td>(1) Real Interest Rate</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>(2) Dummy Variable</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>(3) Required Reserves</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(4) Inflation</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(5) Foreign-Domestic Interest Rate Differential</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(6) Overvaluation of the currency</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 7.1

Summary table of financial repression
Proxies for the growth model
In Tables 7.2 and 7.6, Summary Tables of the signs of the coefficients in both the long-run and short-run models are presented. The numbering of the proxy are in accordance with the presentation of the empirical results in Section 6.3, for example, Proxy One represents the model that incorporate the interest rate, Proxy Two the Dummy Variable, Proxy Three, the Commercial Banks' Reserve and so on.

<table>
<thead>
<tr>
<th>Proxy</th>
<th>ROS</th>
<th>GS</th>
<th>FR</th>
<th>DR</th>
<th>FS/FSY</th>
<th>GD</th>
</tr>
</thead>
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<tr>
<td>One</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Two\textsuperscript{13}</td>
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<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
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<tr>
<td>Three</td>
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<td></td>
<td>-</td>
<td>+</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td></td>
<td>-</td>
<td>+</td>
<td></td>
<td>+</td>
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<tr>
<td>Five</td>
<td></td>
<td>+</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six(a)</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six(b)</td>
<td>+</td>
<td></td>
<td>-</td>
<td>+</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Table 7.2
Summary table of coefficient signs
Long-run growth models

<table>
<thead>
<tr>
<th>Proxy</th>
<th>ROS</th>
<th>GS</th>
<th>FR</th>
<th>DR</th>
<th>FS/FSY</th>
<th>GD</th>
<th>(\Delta Y_{G,-1})</th>
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</thead>
<tbody>
<tr>
<td>One</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two\textsuperscript{14}</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td>+</td>
<td></td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Six(a)</td>
<td>+</td>
<td>+</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six(b)</td>
<td>+</td>
<td></td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.3
Summary table of coefficient signs
Short-run growth models

\textsuperscript{13} Dummy representing one when moderately negative.

\textsuperscript{14} Dummy representing one when severely negative.
Some conflicts arise as a result of the estimates obtained in the growth model. These focus mainly around two financial repression proxies: the real rate of interest and the inflation rate. In the earlier findings it was shown that increases in the real deposit rate did not stimulate savings or investment. Similarly, lower inflation levels did not encourage savings. Yet our results for the growth models indicated the very opposite in the long-run. Lower levels of financial repression measured through higher real interest rates and lower rates of inflation promote economic growth. Various possibilities were examined in an attempt to reconcile the conflicts between the model specifications in the previous and current chapters.

When an analysis of the result for the dummy variable proxy, commercial banks' reserve proxy and the foreign-domestic interest rate differential was made, the policy implication was also one of liberalisation. Generally, similar results for these proxies have been found throughout the course of this research. While no distinction was made between the long-run and the short-run for the dummy variable proxy, long run growth results for Proxy Three and Five are consistent with those of the savings and investment models.

Based on the empirical results the exchange rate should vary depending on the forces of demand and supply. However the successful liberalisation of prices in the external sector is not something which can be easily achieved. It is linked to developments in the internal market, and the evidence in the latter is mixed especially when the results for Chapters Five and Six are examined.

Country based evidence has shown that if liberalisation policies are to be pursued, there must be careful sequencing of internal and external liberalisation and close monitoring to ensure no "upward financial repression"\(^{15}\). This, all to often has been the outcome of countries (southern cone, for example, Argentina and Chile) that pursued liberalisation policy too quickly.

The sign of the coefficients of the other explanatory variables are as expected. Foreign savings, the real overall surplus on the balance of payment and exports (where included) has a positive influence on growth in the long-run and the short-run. In the short-run the dependency ratio is inversely related to growth while in the long-run its impact is positive. Government savings contributed to increasing economic growth while the results for government debt are mixed.

\(^{15}\) See Chapter Two.
The policy recommendation based on the empirical evidence obtained in this chapter indicates that a cautious policy of gradual liberalisation should be embarked upon in Trinidad and Tobago so as to avoid drastic changes too quickly. The research in this study has spanned the period 1960 to 1991. During 1988/1989, the International Monetary Fund (IMF) was approached for assistance. In 1993 the exchange rate was partially liberalised and interest rate increased as part of the IMF conditionality. However at this time it is not possible to assess the claims of the financial repression theory since too little time has elapsed.
8.1 Introduction

Markets in developing countries are inclined to be in a state of disequilibrium. One of the main reasons for this feature is the interventionist policies of the government. Most economic models however, assume that the market clears because of the operation of the price mechanism and that there is no excess supply or demand at existing prices. Leff and Sato (1975), for example, specify and estimate simultaneously a saving and investment function. While Fry (1978), although critical of a simultaneous model, chose to estimate only a savings function and not an investment function since he assumed that the developing countries under study were on their savings and not their investment function. Others (Giovannini;1985, Laumas;1989, Gupta; 1987) simply estimate savings and investment functions without taking into consideration the status of the market.

In many developing countries the "visible" hand of the government is apparent in the day-to-day operation of the market. The exchange rate and the interest rate are to a large extent under the influence of government control and dependent on the current policies being pursued. The underlying characteristic of a financially repressed economy is the imposition of controls and restrictions on the movement of prices. The very nature of this assumption indicates that the market will rarely achieve a status of equilibrium whereby, for example, the supply of planned savings will exactly satisfy the planned demand for investible resources. The intervention of the authorities in the money market makes it virtually impossible for the interest rate and the exchange rate to attain their market clearing levels. Hence to apply an economic model that assumes automatic market clearing to this type of economy might be misleading.

Three scenarios in estimating the disequilibrium model are considered in this chapter. Firstly an equilibrium model of saving and investment is formulated and estimated, secondly, a disequilibrium model is formulated without taking into consideration the idiosyncrasies of a financially repressed economy. Thirdly a disequilibrium model with financial repression is formulated. One aspect of a financially repressed economy is that the price level is fixed by the authorities below the market clearing level (see Figure 1.1 in Chapter One). This would seem to suggest that the market is in a state of perpetual disequilibrium, more specifically a state of excess demand (i.e. demand for investible resources exceeds the supply of investible resources). If this is true, then
according to Fair and Jaffe, there are important implications for the demand and supply equations in a disequilibrium model which will be discussed later.

An application of disequilibrium econometrics methodology fulfils three goals. Firstly it allows testing of our initial hypotheses, i.e. whether financial repression serves to enhance the mobilisation of saving and encourage higher investment levels? Secondly, we are also able to statistically test whether or not the market is in disequilibrium. Technically speaking, a financially repressed economy is one in disequilibrium as alluded to in the discussion above. In order to accept this hypothesis the coefficient of the disequilibrium variable \( \Delta R \) should be significant. Lastly, whether there is only excess demand in a financially repressed economy and no excess supply as suggested by the literature.

8.2 The General Model
Fair and Jaffe (1972) attempted to overcome the dilemma of estimating markets in disequilibrium. They examined the econometric problems associated with the estimation of demand and supply schedules in a disequilibrium market. The main problem in an estimation of this type is that in the absence of the equilibrium condition the observed quantity traded in the market may not satisfy the demand and supply schedules; that is, ex ante demand and supply cannot be equated to the observed quantity traded in the market. They developed four methods of estimating markets in disequilibrium. The first method is based upon the maximisation of a likelihood function and is a generalisation of an earlier method developed by Quandt (1958)\(^1\). The second and third

\[ Q_t = k_t(\alpha_0 X_t + \alpha_1 P_t + \nu_t) + (1 - k_t)(\beta_0 Y_t + \beta_1 P_t + \varepsilon_t) \]

where

\[ k_t = \begin{cases} 0 & \text{if } Q_t = S_t, \\ 1 & \text{if } Q_t = D_t. \end{cases} \]

It is assumed that the error terms are normally and independently distributed and are independent of the explanatory variables. The task is to estimate the parameters \( \alpha_0, \alpha_1, \beta_0, \beta_1 \) and the values of \( k_t \) given the observations \( X_t, Y_t, P_t \) and \( Q_t \).

An appropriate method of estimating the above is a generalisation of Quandt's maximum likelihood technique for estimating the position of a switching point in a linear regression system. In this the objective is to determine a large number of switching points, unlike Quandt who was concerned with one switching point. A switching point occurs each time the situation changes from the quantity demanded being observed to the quantity supplied being observed.

\[ \text{1 The Maximum Likelihood Method} \]

In the maximum likelihood method \( Q_t \) is the actual quantity observed during period \( t \) and it satisfies either the demand schedule or the supply schedule. Equations (8.1) and (8.2) can be combined to yield
methods utilise the change in price as a qualitative factor in determining sample separation. In the third method supply and demand equations are fitted to each set of sample separations and the likelihood function is estimated for each case. The fourth method uses the change in price as a quantitative proxy for excess demand and supply condition and is an integral component of the final equations to be estimated in this section. Although reference will be made to methods one and three, the discussion will concentrate on the other methods. This is because with a sample size of only thirty observations the application of maximum likelihood estimation methods are much less reliable.

In its most fundamental form the modelling of a market in disequilibrium is assumed to consist of one demand and one supply equation

\[ D_t = \alpha_0 X_t + \alpha_1 P_t + \nu_t \]  
\[ S_t = \beta_0 Y_t + \beta_1 P_t + \epsilon_t \]

\( D_t \) denotes the quantity demanded during time \( t \). \( S_t \) the quantity supplied during an equivalent time. \( P_t \) represents the price of the good during time \( t \) and \( X_t \) and \( Y_t \) denote variable other than the price level and the error terms (\( \nu_t \) and \( \epsilon_t \)) that influence demand.

The relevant likelihoods of supply and demand observations are

\[ (2\pi \sigma^2_D)^{-m/2} \exp \left[ -\frac{1}{2\sigma^2_D} \sum_{i}^m (D_i - \alpha_0 X_i - \alpha_1 P_t)^2 \right] \]

\[ (2\pi \sigma^2_S)^{-n/2} \exp \left[ -\frac{1}{2\sigma^2_S} \sum_{i}^n (S_i - \beta_0 Y_i - \beta_1 P_t)^2 \right] \]

where \( m \) is the number of observations for which \( Q_t = D_t \) (excess supply; falling prices), and \( n \) is the number of observations for which \( Q_t = S_t \) (excess demand; rising prices). The sums denote summation over those observations for which \( Q_t = D_t \) and \( Q_t = S_t \), respectively. We can now write the likelihood function for the entire sample:

\[ L = (2\pi \sigma^2_D)^{-m/2}(2\pi \sigma^2_S)^{-n/2} \exp \left[ -\frac{1}{2\sigma^2_D} \sum_{i}^m (D_i - \alpha_0 X_i - \alpha_1 P_t)^2 - \frac{1}{2\sigma^2_S} \sum_{i}^n (S_i - \beta_0 Y_i - \beta_1 P_t)^2 \right] \]

For any given sample separation the log of \( L \) can be differentiated with respect to \( \alpha_0, \alpha_1, \beta_0, \beta_1 \). The estimates of the latter can be found upon setting these derivatives equal to zero and solving the resulting equations. The solution is thus to choose the sample separation and estimate the parameters.
and supply respectively. Both functions are orthodox in that, they relate the demand and supply of a particular to good to its price level. Because they are standard functions one would expect $\alpha_i$ to be negative and $\beta_i$ to be positive (as the price of a good increases its demand falls while its supply rises).

If we were assuming a full equilibrium model then $D_t = S_t$. However the distinguishing characteristic of markets in disequilibrium is that prices are not assumed to adjust each period so as to equate demand and supply, that is:

$$P_t \neq \frac{\beta_o}{(\alpha_i - \beta_i)}Y_t - \frac{\alpha_o}{(\alpha_i - \beta_i)}X_t + \frac{\epsilon_t - \nu}{(\alpha_i - \beta_i)}$$ \hspace{1cm} (8.3)

The observed quantity actually being traded is always indicated by the shorter side of the market:

$$Q_t = \min\{D_t, S_t\}$$ \hspace{1cm} (8.4)

This implies that if quantity demanded exceeds the quantity supplied than potential purchasers go unsatisfied and the quantity supplied is the quantity traded. Conversely if quantity supplied exceeds the quaintly demanded, a surplus of stock follows, suppliers face unintended additions to their inventories and the quantity demanded represents the quantity traded. Methods two, three and four are based on this assumption.

According to Fair and Jaffe, additional information on the relationship between changes in the price level and excess demand or supply are necessary for the estimation of the model. A change in the price level is formulated as some function of the excess demand existing in the market. The change in price is subsequently to be used as an indicator of excess supply or demand in the market. The following price adjustment equation can be postulated:

$$\Delta P_t = f(D_t - S_t)$$ \hspace{1cm} (8.5)

where price changes are assumed to be a positive function of excess demand in the market hence

$$f'(D_t - S_t) > 0$$
Furthermore

\[ \Delta P_t > 0 \text{ as } D_t - S_t > 0 \text{ or } D_t > S_t \]  
\[ \Delta P_t = 0 \text{ as } D_t - S_t = 0 \text{ or } D_t = S_t \]  
\[ \Delta P_t < 0 \text{ as } D_t - S_t < 0 \text{ or } D_t < S_t \]  

The change in price is positive when demand is greater than supply, when supply satisfy demand the change in price is zero and finally, excess supply is associated with negative levels of price changes. The direction of the price change is an indicator of excess demand or supply in the market, for example, if price change is upwards then demand is greater than supply and the market experiences a period of excess demand. Assuming that price is directly proportional to the amount of excess demand:

\[ \Delta P_t = \lambda (D_t - S_t) \]  

\( \lambda \) depends on the length of the time period. Where \( \lambda = 0 \) there is no adjustment and where it equals \( \lambda = \infty \) there is perfect adjustment.

### 8.2.1 The Directional Methods

In Figure 8.1 the price level is on the vertical axis and quantity on the horizontal with supply and demand curves are indicated in the diagram by DD and SS.

![Figure 8.1 An illustration of the Directional Method](image)
$P_0$ denotes the price at which the market clears. A supply of $Q_s$ exactly satisfies demand. Excess demand occurs whenever the price is less than $P_0$, which suggests that the price level must be rising (from equation 8.6a). For example, at a price of $P_1$ excess demand is equivalent to $D_1 - S_1$ and there will be an inclination for prices to increase to $P_1'$. Additionally, from equation (8.3), in conditions of excess demand the quantity supplied is the quantity traded. In periods of excess supply the opposite is true, according to equation (8.6c) there will be evidence of a falling price level. At a price of $P_2$, there is excess supply of $D_2 - S_2$ and a tendency for price to fall to $P_2'$. At a price of $P_2$, quantity demanded is the quantity traded and supply is unobserved. In periods of rising prices (excess demand) the supply schedule will be observed and in periods of falling prices (excess supply) the demand schedule will be observed.

The first step in implementing method two is to separate sample periods into periods of excess demand and excess supply based on the observed price change. If prices are rising there is excess demand and when prices are falling there is excess supply. In this equation we do not use $\Delta P$ as an explanatory variable but the actual price levels. For example, assume in year two, $\Delta P$ is positive but negative in year three. Year two would then be associated with excess demand and the corresponding price level used in fitting the supply equation. Conversely, in year three there is excess supply and the appropriate price level for this year should be utilised in estimating the demand equation. The demand function is estimated only over periods of excess supply ($\Delta P < 0$) while the supply function is estimated over periods of excess demand ($\Delta P > 0$). In periods of equilibrium, where there is no change in the price level observations are included in both demand and supply schedules. The actual portions of the demand and supply curves which are estimated in this model are marked in Figure 8.1 by the darkened lines. The supply curve is indicated by the darkened line below the equilibrium level. While the demand curve is indicated by the darkened line above the equilibrium level.

This method, unfortunately is not without drawbacks. It will only be correct under the specified assumptions, given that there are no errors in the price equation. Even if there is accurate sample separation, the model appears to be inconsistent. An example, can be examined using the supply equation. Quantity observed will only be equalled to that supplied when supply is less than demand. In other words when $Q_s = S_s = \beta_0 y_t + \beta_1 P_t + \epsilon_t$ is smaller than $D_t = \alpha_0 X_t + \alpha_1 P_t + \nu_t$. Supply will be less than demand more often when $\epsilon_t$ is small than large and hence the mean for the error terms $\epsilon_t$ over periods of excess demand will not be zero. Furthermore these means are not independent of $y_t$. Larger values of $y_t$ will more often be associated with smaller
value of $\varepsilon_i$ than large values. Although estimates of this model can be estimated they are not consistent.

The third method can be considered a version of the likelihood approach. It adopts a number of sample separations corresponding to alternative assumptions about the excess demand or supply status of the markets in doubtful periods. Where "doubtful" may be defined as a period when the change in price is so small or variable or responds to lagged values of excess demand. Supply and demand equations are then estimated for each set of sample separations and the likelihood function is then evaluated.

8.2.2 The Quantitative Method

This method utilises a single and simultaneous model estimation to obtain the parameters of the demand and supply functions. Unlike in the other methods both functions are estimated over the entire sample period. The adjustment process utilised is based on equation (6). Rewriting in terms of excess demand gives

$$D_t - S_t = \frac{1}{\lambda} (\Delta P_t)$$  \hspace{1cm} (8.8)

During a period of rising prices ($\Delta P_t \geq 0$), when there is excess demand the quantity traded will be equal to the supply hence the supply function can be estimated directly:

$$Q_t = S_t = \beta_0 Y_t + \beta_1 P_t + \varepsilon_t$$  \hspace{1cm} (8.9)

Using equation (8.8) the demand equation is of the form:

$$Q_t = D_t = \frac{1}{\lambda} \Delta P_t = \alpha_0 X_t + \alpha_1 P_t - \frac{1}{\lambda} \Delta P_t + \nu_t$$  \hspace{1cm} (8.10)

During periods of excess supply when prices are falling ($\Delta P_t \leq 0$) the quantity traded is equivalent to the quantity observed and its function can be written as:

$$Q_t = D_t = \alpha_0 X_t + \alpha_1 P_t + \nu_t$$  \hspace{1cm} (8.11)

Using equation (8.8) the supply function:

$$Q_t = S_t = \frac{1}{\lambda} |\Delta P_t| = \beta_0 Y_t + \beta_1 P_t - \frac{1}{\lambda} |\Delta P_t| + \varepsilon_t$$  \hspace{1cm} (8.12)
We can reduce equations (8.9) to (8.12) to a single demand equation (8.13) and supply
curve equation (8.14) to be estimated over the entire period by making appropriate
adjustment for the change in price.

\[ Q_i = D_i - \frac{1}{\lambda} (\Delta P_i)^D = \alpha_0 X_i + \alpha_1 P_i - \frac{1}{\lambda} (\Delta P_i)^D + \nu_i \] (8.13)

where \((\Delta P_i)^D\) is 0 when there is excess supply and \(\Delta P_i\) otherwise.

\[ Q_i = S_i - \frac{1}{\lambda} (\Delta P_i) = \beta_0 X_i + \beta_1 P_i - \frac{1}{\lambda} (\Delta P_i) + \epsilon_i \] (8.14)

where \((\Delta P_i)^\uparrow\) is 0 when there is excess demand and \(-\Delta P\) otherwise.

In estimating equations (8.13) and (8.14) the coefficients \(\Delta P_i\) must be equal and
opposite in magnitude. In order to relax this constraint a simple alteration of equation
(8.8) is necessary:

\[ D_i - S_i = \frac{\Delta P_i}{\lambda_1} \] (8.15)

when \((\Delta P_i \geq 0)\)

\[ D_i - S_i = \frac{\Delta P_i}{\lambda_2} \] (8.16)

when \((\Delta P_i \leq 0)\).

This translates into

\[ D_i - S_i = \frac{1}{\lambda_1} (\Delta P_i) \] (8.17)

when \((\Delta P_i \geq 0)\) and

\[ D_i - S_i = \frac{1}{\lambda_2} (\Delta P_i) \] (8.18)

when \((\Delta P_i \leq 0)\).

The demand and supply equations can then be rewritten in the following forms, firstly
under conditions of excess demand:

\[ Q_i = D_i - \frac{1}{\lambda} \Delta P_i = \alpha_0 X_i + \alpha_1 P_i - \frac{1}{\lambda} \Delta P_i + \nu_i \] (8.17)

\[ Q_i = S_i = \beta_0 X_i + \beta_1 P_i + \epsilon_i \] (8.18)
and excess supply:

\[ Q_t = D_t = \alpha_0 X_t + \alpha_1 P_t + \nu_t \]  

(8.19)

\[ Q_t = S_t - \frac{1}{\lambda_2} |\Delta P_t| = \beta_0 Y_t + \beta_1 P_t - \frac{1}{\lambda_2} |\Delta P_t| + \epsilon_t \]  

(8.20)

Rewriting equations (8.17) to (8.20) to give one demand and supply equation:

\[ Q_t = D_t - \lambda_1^* (\Delta P_t)^D = \alpha_0 X_t + \alpha_1 P_t - \lambda_1^* (\Delta P_t)^D + \nu_t \]  

(8.21)

where \( \lambda_1^* = \frac{1}{\lambda_1} \)

\( (\Delta P_t)^D \) is 0 when there is excess supply and \( \Delta P_t \) otherwise.

and

\[ Q_t = S_t - \lambda_2^* (\Delta P_t)^S = \beta_0 Y_t + \beta_1 P_t - \lambda_2^* (\Delta P_t)^S + \epsilon_t \]  

(8.22)

where \( \lambda_2^* = \frac{1}{\lambda_2} \)

\( (\Delta P_t)^S \) is 0 when there is excess demand - \( \Delta P \) otherwise.

An econometric problem that arises with this method is that of simultaneous equation bias due to the endogeneity of \( P_t \), \( (\Delta P_t)^D \) and \( (\Delta P_t)^S \). The endogeneity of \( P_t \) can be overcome by assuming that \( P \) enters the equation with a lag. With respect to the endogeneity of \( (\Delta P_t)^D \) and \( (\Delta P_t)^S \), an application of two stage least squares replaces these with their fitted values, obtained by regressing the variables on the instruments. Consider for example, the demand equation, \( (\Delta P_t)^D \) by definition must be zero whenever \( M, \) negative (excess supply). This suggests that the fitted values of \( (\Delta P_t)^D \) cannot be obtained by estimating the first stage regression over the entire sample and using the entire set of fitted values in estimating the second stage regression. Since this does not ensure that \( (\Delta P_t)^D \) will be zero during periods of excess supply, rather it is more likely to obtain non-zero fitted values in the first stage regression over the entire period. If the second stage regression is subsequently estimated, using these fitted values there is no guarantee that \( (\Delta P_t)^D \) will be zero when there is excess supply in the second stage regression and the results can be misleading. In order to avoid this, the first stage regression should only be estimated over those periods for which \( \Delta P_t \) is non-negative (excess demand) and use the fitted values to construct the series that enter the second stage regression. Zeros are inserted for the periods when \( \Delta P_t \) is negative (excess supply).
The endogeneity of \((\Delta P)^s\) in the supply equation can also be dealt with in a similar way. That is, because \((\Delta P)^s\) is zero whenever there is excess demand \((\Delta P^s > 0)\), the first stage regression should only be estimated over those periods in which \((\Delta P)^s\) is negative (there is excess supply), the resulting fitted values are then used to construct the appropriate variable to be used in the second stage regression with zeros inserted for periods of excess demand \((\Delta P^d > 0)\). This guarantees that \((\Delta P)^d\) and \((\Delta P)^s\) is zero in the demand equation when there is excess supply, and in the supply equation when there is excess demand respectively.

When \(P\) and \((\Delta P)^s\) as well as \((\Delta P)^d\) are endogenous the fitted values of \(P\), must be constructed as \(\left(\hat{\Delta P}_t\right)^D + \left(\hat{\Delta P}_t\right)^S + P_{t-1}\) (the superscripts on \(P\), the represents the corresponding fitted values). These fitted values are obtained as discussed above.

As in the directional model the first step is to separate the sample into periods of excess demand and excess supply. The \(\Delta P\) that are negative indicate excess supply and included in the demand equation together with the price variable as a separate and distinct explanatory variable. The \(\Delta P\) that are positive indicates excess demand and is included in the supply equation along with the price variable for the entire period. In the quantitative method, the model to be estimated incorporates a level variable and a differenced variable to represent the disequilibrium nature of the market. This is unlike the directional model which only incorporated level variables.

8.3 A Saving and Investment Model Based on the Quantitative Disequilibrium Method

The models to be estimated comprise of saving and investment functions. Two points of clarification are necessary at this stage. Firstly a financially repressed economy has been illustrated as one in which the price is fixed at a particular level below the market clearing price for the entire period under consideration. This is not necessarily so, because although the authorities fix prices below equilibrium level there is some room for variations once it does not surpass a stipulated level. These variations although influenced by market conditions are not totally dependent on the operation of the price mechanism. For example, while upward and downward movements in the interest rate are apparent, the market as a whole, does not attain the price at which it will clear. This is because of the guidelines concerning controls and the degree of price leverage imposed by the monetary authorities on the financial sector. This can perhaps be
illustrated in Figure 8.2 if we interpret $P_1$ (darkened line) as the price above which the interest rate cannot rise. Hence the rate is allowed to vary once it remains less than $P_1$.

The second point of clarification is related to the first. In a financially repressed economy as illustrated in Figure 8.2 there is continuous excess demand over the entire period. Even though the changes in price are both positive (excess demand) and negative (excess supply in a market where there are no restrictions) the market as a whole, is still in a state of excess demand. This is because there are varying degrees of excess demand.

In a market clearing model, at prices below the equilibrium price there is excess demand, indicating that prices must be rising. While at prices above the equilibrium rate there is excess supply which suggests that prices must be falling. In a financially repressed economy prices are not allowed to rise above a specific rate but deviate around that rate. Since $P_1$ is the ceiling, prices are allowed to fall to $P_2$ rise to $P_3$ and $P_1$ and fall again. It is obvious that there is excess demand and no excess supply at all three prices, rather it is the amount of excess demand that changes. At $P_3$ excess demand is $S_1 - D_1$, while at $P_1$ it rises to $S_2 - D_3$. In the financially repressed model,
falling prices, are not associated with excess supply, unlike in the equilibrium model where, the higher prices are above the market clearing rate the greater would be the amount of excess supply and the degree to which prices would fall.

In the financially repressed economy falling prices should be associated with less excess demand. While rising prices represent more excess demand. For example, a decline in price from \( P_0 \) to \( P_1 \) is associated with less excess demand since \( (S_1 - D_1) < (S_0 - D_0) \). While a fall in price to \( P_2 \) from \( P_3 \) say is associated with excess supply \( (Q_3 - Q_0) \). In the same way that excess supply can bring about a fall in prices less excess demand also causes a reduction in the price level.

Based on Fair and Jaffe's methodology only an estimation of the supply equation is possible in a financially repressed economy. There are no periods of excess supply, hence any estimation of the demand equation (the demand for investible resources) is impossible since demand is unobserved. The supply equation can then be estimated over the entire period since excess demand exists over the entire period. That is, the quantity traded is equivalent to the supply since the supply is less than the demand i.e. \( S_t = \beta_0 Y_t + \beta_1 P_t + \epsilon_t \) is less than \( D_t = \alpha_0 X_t + \alpha_1 P_t + u_t \). Perhaps the use of disequilibrium econometrics can be seen as providing a justification for Fry's (1978) assumption that the LDCs in that study were on their savings function and not their investment.

The savings can be perceived as the supply function of loanable funds and investment a demand function for investible resources. Firstly the savings function in its general form:

\[
S_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 F S_t + \alpha_3 R_t + u_{it},
\]  

(8.23)

Where \( S \) is some measure of savings, \( Y \) is an income variable, \( FS \) represents foreign savings, \( R \) is the real rate which is assumed to be the price which equates market demand to supply. The investment function is of the form:

\[
I_t = \beta_0 + \beta_1 Y_t + \beta_2 F S_t + \beta_3 R_t + u_{it},
\]  

(8.24)

Rewriting the saving equation incorporating the price adjustment \( \left( I_t - S_t = \frac{1}{\lambda} (\Delta R_t) \right) \)

without relaxing the constraint gives

\[
Q_t = S_t - \frac{1}{\lambda} (\Delta R_t)^{\delta} = \alpha_0 + \alpha_1 Y_t + \alpha_2 F S_t + \alpha_3 R_t - \frac{1}{\lambda} (\Delta R_t)^{\delta} + u_{it},
\]  

(8.25)

170
where $Q_t$ represents the actual quantity of resources which is traded in time $t$. $(\Delta R_t)^s$ is 0 when there is excess demand for investible resources and $-\Delta R$ otherwise.

The investment function is written as

$$Q_t = I_t - 1/\lambda (\Delta R_t)' = \beta_0 + \beta_1 Y_t + \beta_2 FS_t + \beta_3 R_t - 1/\lambda (\Delta R_t)' + u_{2t}$$

(8.26)

where $(\Delta R_t)'$ is 0 when there is excess supply and $\Delta R$ otherwise.

When the constraint is relaxed the functions are of the form:

$$Q_t = S_t - \lambda_1^* (\Delta R_t)^s = \alpha_0 + \alpha_1 Y_t + \alpha_2 FS_t + \alpha_3 R_t - \lambda_1^* (\Delta R_t)^s + u_{1t}$$

(8.27)

where $(\Delta R_t)^s$ is 0 when there is excess demand and $-\Delta R$ otherwise and where $\lambda_1^* = \frac{1}{\lambda_1}$.

$$Q_t = I_t - \lambda_2^* (\Delta R_t)' = \beta_0 + \beta_1 Y_t + \beta_2 FS_t + \beta_3 R_t - \lambda_2^* (\Delta R_t)' + u_{2t}$$

(8.28)

where $(\Delta R_t)'$ is 0 when there is excess supply and $-\Delta R$ otherwise and where $\lambda_2^* = \frac{1}{\lambda_2}$.

In the financially repressed economy the market is in a state of continuous disequilibrium whereby excess demand prevails over the entire period of repression. Imposition of restrictions on prices below the market clearing level ensures that the demand for investible resources is always larger than its supply (savings). In such a scenario the appropriate supply of savings and demand for investible funds will be of the following form:

$$Q_t = S_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 FS_t + \alpha_3 R_t + u_{1t}$$

(8.29)

$$Q_t = I_t - \frac{1}{\lambda} (\Delta R_t) = \beta_0 + \beta_1 Y_t + \beta_2 FS_t + \beta_3 R_t - \frac{1}{\lambda} (\Delta R_t) + v_t$$

(8.30)

where $(\Delta R_t)$ is $\Delta R$ because of the excess demand for investible funds.
When there is excess demand the supply function can be directly estimated in its original form since the observed quantity traded is the quantity supplied. That is, if the disequilibrium variable was to be included in the supply function it would be zero over the since there are no periods of excess supply only excess demand. The adjustment parameter is subsequently employed to derive the demand equation as above. Based on the assumptions of a financially repressed economy and the technicalities of the disequilibrium methodology \((1/\lambda)\) in equation (8.30) will at no time be equal to zero. This is because in the demand equation \((1/\lambda)\) should be equal to zero only in periods of excess supply, and by definition there are no such periods in a financially repressed economy.

Estimation of a disequilibrium model may strengthen or weaken our results about financial repression. If the previous results are to be confirmed the coefficient of \(R_i\) in the savings equation should be negative indicating that an increase in the interest rate does not stimulate savings. This is not consistent with the conventional supply-price relationship in which supply is positively related to the price level.

When the supply equation in the disequilibrium model is estimated (equation 25 or 27) one would expect the sign of \((\Delta R_i)\) to be negative. A conflict will arise if the coefficients of \(R_i\) and \((\Delta R_i)\) are negative, since based on the theory the former is expected to be positive and the latter negative. The \((\Delta R_i)\) variable is important to the extent that it represents disequilibrium. If it is statistically significant it suggests that the market is in disequilibrium with excess supply. Also the smaller the coefficient the slower is the ability of the market to adjust and the more persistent is the disequilibrium. A negative coefficient of this variable cannot be interpreted as an inverse relationship between \((\Delta R_i)\) and savings since \((\Delta R_i)\) is \(-\Delta R\) when there is excess supply. As long as the coefficient is non-zero there is excess supply and this condition will hold. If there is no excess supply it will not be valid and \((\Delta R_i)\) could be safely omitted from the savings model. This coefficient should be insignificant in the Trinidad and Tobago model if we are to accept that the economy is financially repressed characterised by no excess supply (refer to Figure 8.2) only varying degrees of excess demand.

With respect to the investment equation the coefficients of both \(R_i\) and \((\Delta R_i)\) should be negative. This would strengthen our earlier results in Chapters Six and Seven. The coefficient of \((\Delta R_i)\) would provide information of the disequilibrium nature in the savings-investment market. A negative sign does not create any complication in its interpretation as in the savings model. It indicates an inverse relationship between the
disequilibrium variable and investment. It is expected to be significant in an economy which exhibits symptoms of financial repression.

Six proxies of financial have been explored thus far in the research. However in estimating saving and investment functions from a disequilibrium approach only the real interest rate will be utilised. This is because a methodology which models markets in disequilibrium framework incorporates traditional demand and supply equations which include a price variable. As a result, the other proxies of financial repression are inappropriate in the disequilibrium model. The only other price variable that has been incorporated in the model is the exchange rate. However it is not an explicit part of the model, rather it is included implicitly by employing some definition of exchange rate misalignment.

In some instances a dummy variable has been included in the saving and investment functions. (Dummy variables were not included in the Engle-Granger long run cointegrating model because they are integrated of order zero). The reason being to take into consideration the period of the oil boom 1974-1981. Oil is the main export of Trinidad and Tobago contributing approximately 30% of gross domestic product and 60-70% percent of total exports. In addition to a dummy, another stationary variable is also included in the model. The variable which represent the disequilibrium nature of the market (ΔR) is integrated of order zero. In the disequilibrium methodology, unlike in the models estimated by the cointegration methodology, stationary and non-stationary variables are included and estimated.

8.4 Empirical Results and Implications for Policy

In the first instance an equilibrium model will be estimated. That is, we assume \( D_t = S_t \), rather than using an adjustment factor to incorporate disequilibrium. The market is free to attain the price at which it will clear. At any price above this level there is excess supply and a tendency for prices to fall. At prices below there is excess demand and a tendency for prices to be on the rise. A disequilibrium model of saving and investment model will be subsequently estimated utilising both, the directional models and secondly, the quantitative model. With respect to the latter single and two stages least squares estimation methods are employed. Lastly, we will estimate the disequilibrium model which is appropriate to a financially repressed economy. The form of this model will be based upon the definition of a financially repressed economy as specified in Section 8.3. In most instances different specifications of each model are estimated and presented.

173
8.4.1 Equilibrium Model

Two stage least squares methods are used in estimating an equilibrium model of savings and investment. The estimates in Table 8.1 corresponds to those in Table 8.2. For example, when the dummy is included as an explanatory variable in the savings model, real government debt is included as an explanatory variable in the investment model. Similarly when government debt is included in the savings equation, the dummy variable is included in the investment model. The diagnostics are presented immediately below the model estimates.

The intention of models to be fashioned in this way is in an attempt to preserve the identification of the simultaneous model. A maximum of thirty one observations is available. Such scarcity of data creates a disincentive to include too many independent variables because of the potential reduction in the efficiency of the results. There is also a limitation in the number of explanatory variables which can be included in the model because of the general lack of data. A dummy (Dum) variable has been incorporated in an attempt to take into consideration the oil boom in Trinidad and Tobago (1974-1981).

**Dependent Variable (S/Y)**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Variable Coefficients</th>
<th>R²</th>
<th>DW</th>
<th>B-J</th>
<th>Het</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) S/Y = 0.0951 +0.7269YG -0.2729FSY -0.0093R +0.0794Dum</td>
<td>(2.806) (1.698) (-2.476) (-1.515) (2.828)</td>
<td>0.86</td>
<td>1.74</td>
<td>0.183</td>
<td>1.918</td>
</tr>
<tr>
<td>       Reset (LM $\chi^2$) = 0.800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) S/Y = 0.1355+0.7211YG -0.4237FSY -0.0095R -0.000005GD</td>
<td>(3.435) (4.021) (-2.411) (-2.763) (-2.204)</td>
<td>0.88</td>
<td>2.09</td>
<td>1.745</td>
<td>3.541</td>
</tr>
<tr>
<td>       Reset (LM $\chi^2$) = 2.190</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8.1
Estimates of the saving rate equation in an equilibrium model

174
The results for the equilibrium model generally reflect those found in Chapters Five and Six. The interest rate has a negative impact on both the saving and investment rates. In the savings models the real interest rate is significant in the second specification (where the dummy variable is excluded), where the latter is excluded in favour of real government debt the significance level falls. In the investment model the opposite is true. While the real interest rate it is significant at the 5 percent level in the first specification, it is not significant in the second specification (when the dummy is included). These results suggest that dummies could be explained by the financial repression proxy, that is the dummy was in fact a proxy for other variables which were omitted from the specification. The coefficients signs of all other explanatory variables are as expected.

---

2 See Roubini and Sal-i-Martin (1992)
8.4.2 Directional Model

In fitting the directional models of the saving and investment rates, ordinary least squares estimation was used. The estimates of the savings model are presented first followed by that of the investment model. Since the quantity traded is always equal to the shorter side of the market. The savings functions is estimated over periods of excess demand for investment while the investment equation is estimated over periods of excess supply of loanable funds. PXSD in the savings model is the price (real interest rate) when there is excess demand. While PXSS in the investment model is the price level (real interest rate) when there is excess supply.

<table>
<thead>
<tr>
<th>Dependent Variable (S/Y)</th>
<th>Equation 1</th>
<th>Equation 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) S/Y = 0.1098 +0.4361YG -0.3373FSY -0.0060PXSD +0.1023Dum</td>
<td>R² =0.91</td>
<td>R² =0.93</td>
</tr>
<tr>
<td></td>
<td>DW = 1.72</td>
<td>DW = 1.61</td>
</tr>
<tr>
<td></td>
<td>B-J (χ(2)) = 0.557</td>
<td>B-J (χ(2)) = 1.401</td>
</tr>
<tr>
<td></td>
<td>Het F(1,30)= 0.239</td>
<td>Het F(1,30)= 0.175</td>
</tr>
<tr>
<td></td>
<td>Reset F(1,25)=1.828</td>
<td>Reset F(1,25)=0.692</td>
</tr>
<tr>
<td></td>
<td>Chow F(2,26)=0.105</td>
<td>Chow F(2,26)=0.274</td>
</tr>
</tbody>
</table>

Table 8.3

Estimates of the saving rate equation in directional model one
In the directional model the variable to represent the disequilibrium status of the market is incorporated as the real interest rate corresponding to periods of excess demand and excess supply. The supply of loanable funds (savings) function is estimated over periods of excess demand, and this variable is negative and significant. The demand for investment function estimated over periods of excess supply has a disequilibrium variable that is also negative but insignificant.

This provides initial evidence to illustrate that in the Trinidad and Tobago economy excess demand is more relevant than excess supply. Moreover it provides a basis for accepting that the economy is financially repressed, as an economy cannot by definition be repressed unless there is some degree of disequilibrium which implies that market clearing prices cannot be attained.
8.4.3 Quantitative Model

The estimates of the quantitative model are presented below. Firstly the saving and investment models are estimated separately using a single equation estimation procedure (ordinary least squares). When this method is applied there is no need for the adjustments discussed above since there are no first stage estimates of the disequilibrium variable ($\Delta R$) in either equation. Rather, the ($\Delta R$) variable enters the equation directly and is already zero in the demand and supply equation for the periods of excess supply and excess demand, respectively.

The models are then fitted using two stage least squares without any constraints on the adjustment parameter. The first stage and second stage regression are fitted separately because of the peculiarities of the variable which represents the disequilibrium status of the market. Estimates of the first stage regression are obtained by regressing the ($\Delta R$) in the supply of savings equation on the predetermined variables only for those periods of excess supply. The fitted values when obtained are used in estimating the savings equation with zeros inserted for periods of excess demand. Similarly, in fitting the investment equation estimates of the first stage regression are obtained by regressing the ($\Delta R$) on the predetermined variables only for those periods of excess demand. These values then are used in estimating the investment equation with zeros inserted for periods of excess supply. A second simultaneous model of saving and investment is estimated in the form of Zellner's Seemingly Unrelated Regression Model (Zellner, 1962).

The real interest rate enter the savings equation with a lag of two and the investment equation with a lag of one unlike in the savings and investment models estimated previously in the cointegrating models. Incorporating prices in this manner helps to avoid any possible endogeneity problems associated with the inclusion of this variable. Models are more easily identifiable than in the equilibrium scenario. Real per capita income ($YP$) is also introduced in some models as an explanatory variable along with the level of real credit to the private sector ($CP$). In order to preserve efficiency of the model caution is still exercised so as to prevent the inclusion of too many explanatory variables.
### Table 8.5
Estimates of the savings rate equation in the quantitative model using single equation estimation

<table>
<thead>
<tr>
<th>Dependent Variable (S/Y)</th>
<th>( S/Y = 0.1293 + 0.4287YG - 0.4011FSY - 0.0006(\Delta R) + 0.1051Dum - 0.00133R.2 )</th>
<th>( R^2 = 0.88 )</th>
<th>DW = 1.61</th>
<th>Reset F(1,25) = 2.180</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( R^2 = 0.87 ) ( B-J(\chi(2)) = 1.207 ) Het F(1,30) = 0.0001 Chow F(2,26) = 0.211</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( S/Y = 0.2256 + 0.5052YG - 0.5911FSY - 0.0012(\Delta R) - 0.0001GD - 0.0018R.2 )</th>
<th>( R^2 = 0.87 )</th>
<th>DW = 1.63</th>
<th>Reset F(1,25) = 2.543</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( B-J(\chi(2)) = 0.354 ) Het F(1,30) = 0.047 Chow F(2,26) = 0.044</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 8.6
Estimates of the investment rate equation in the quantitative model using single equation estimation

<table>
<thead>
<tr>
<th>Dependent Variable (I/Y)</th>
<th>( I/Y = 0.1261 + 0.5744YG + 0.6392FSY - 0.00093(\Delta R) + 0.0536Dum - 0.0069R.1 )</th>
<th>( R^2 = 0.67 )</th>
<th>DW = 1.64</th>
<th>Reset F(1,25) = 1.037</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( R^2 = 0.67 ) ( B-J(\chi(2)) = 1.697 ) Het F(1,30) = 0.036 Chow F(2,26) = 0.249</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| \( I/Y = 0.1713 + 0.6959YG + 0.4658FSY - 0.00082(\Delta R) - 0.00006GD - 0.0064R.1 \) | \( R^2 = 0.67 \) | DW = 1.64 | Reset F(1,25) = 1.037 |
|---------------------------|------------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|
|                           | \( B-J(\chi(2)) = 1.697 \) Het F(1,30) = 0.036 Chow F(2,26) = 0.249 |              |             |                       |
### Table 8.7

Estimates of the savings rate equation in the quantitative model using two stage least squares estimation

<table>
<thead>
<tr>
<th>Dependent Variable (S/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) S/Y = 0.2435 +0.4815YG -0.6191FSY -0.00061(ΔR) -0.00006GD -0.0021R_2</td>
</tr>
<tr>
<td>(1.584) (2.085) (-2.523) (-0.169) (-2.476) (-1.009)</td>
</tr>
<tr>
<td>R² =0.86 DW = 1.58 Reset FLM (\chi(1) =0.302)</td>
</tr>
<tr>
<td>B-J ((\chi(2))) = 0.441 Het LM (\chi(1) = 0.282)</td>
</tr>
<tr>
<td>(2) S/Y = 0.2342+0.3184YG -0.5175FSY -0.0017(ΔR) +0.1034Dum -0.0015R_2</td>
</tr>
<tr>
<td>(5.053) (2.822) (-4.173) (-0.564) (4.123) (-0.919)</td>
</tr>
<tr>
<td>R² =0.86 DW = 1.64 Reset LM (\chi(1) =2.357)</td>
</tr>
<tr>
<td>B-J ((\chi(2))) = 1.141 Het LM (\chi(1) = 0.0005)</td>
</tr>
</tbody>
</table>

### Table 8.8

Estimates of the investment rate equation in the quantitative model using two stage least squares estimation

<table>
<thead>
<tr>
<th>Dependent Variable (I/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) I/Y = 0.1627+0.6582YG +0.6317FSY -0.0016(ΔR) +0.00686Dum -0.0089R_I</td>
</tr>
<tr>
<td>(4.225) (3.716) (3.852) (-2.302) (1.163) (-2.556)</td>
</tr>
<tr>
<td>R² =0.68 DW = 1.85 Reset LM (\chi(1) =0.447)</td>
</tr>
<tr>
<td>B-J ((\chi(2))) = 0.327 Het LM (\chi(1) = 0.058)</td>
</tr>
<tr>
<td>(2) I/Y = 0.1537+0.6474YG +0.5612FSY -0.0026(ΔR) -0.00001GD -0.004R_I</td>
</tr>
<tr>
<td>(2.511) (3.220) (2.734) (-1.613) (-3.317) (-1.578)</td>
</tr>
<tr>
<td>R² =0.69 DW = 1.89 Reset LM (\chi(1) =1.860)</td>
</tr>
<tr>
<td>B-J ((\chi(2))) = 0.236 Het LM (\chi(1) = 0.835)</td>
</tr>
</tbody>
</table>

In the savings function of the quantitative model, where \((ΔR^3)\) is non-zero (when there is excess supply), this coefficient is negative and insignificant. However in the investment function where \((ΔR^3)\) is non-zero when there is excess demand, the coefficient is negative and significant. This strengthens our previous results in the
directional models: the economy is characterised by excess demand rather than excess supply, a feature which is typical of an economy which is financially repressed.

If those functions which include excess supply were only examined there might be the temptation to reject the presence of a market in disequilibrium based on the statistical significance of the relevant disequilibrium variable (since there is no significant excess supply). Furthermore, there might be the temptation to do the exact opposite when an examination of the models that incorporate excess demand is undertaken. By definition, there is no excess supply is a financially repressed economy since prices are restricted below their market-clearing price. This ensures that there is only excess demand. Accordingly, variables which represent excess supply should be insignificant.

8.4.3.1 Zellner's Seemingly Unrelated Regression Model
The classical normal linear regression model is unbiased and efficient if the specification of the model represents all there is to know the regression model and the variables involved. If however, there is some external piece of information that has not been taken into consideration then the least squares properties can no longer be considered established. For example, the disturbance term in the investment equation may be correlated with the disturbance term in the savings equation. Under such circumstances Zellner's Seemingly Unrelated Regression (SUR) Model is appropriate.

<table>
<thead>
<tr>
<th>Dependent Variable (S/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/Y = 0.1405 +0.3092YG -0.4175FSY -0.0025(ΔR) +0.1405Dum -0.00093R -2</td>
</tr>
<tr>
<td>(5.339) (1.816) (3.212) (-0.870) (4.249) (-0.597)</td>
</tr>
<tr>
<td>R² = 0.87                DW = 1.79</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable (I/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/Y = 0.1509 +0.6538YG +0.5637FSY -0.0049(ΔR) -0.00005GD -0.0080R -1</td>
</tr>
<tr>
<td>(5.624) (4.194) (4.003) (-2.888) (-3.113) (-3.675)</td>
</tr>
<tr>
<td>R² = 0.65                DW = 1.84</td>
</tr>
</tbody>
</table>

Table 8.9
Estimates of the savings and investment rate equation using the SUR model
These initial results of the quantitative method are quite interesting. In the savings equation $\Delta R$ is negative and insignificant while in the investment equation it is also negative, but significant. The statistical significance of the disequilibrium estimates are not totally surprising. They suggest that in the savings model the variable that captures the disequilibrium nature of the market does not exert a statistically significant influence. While the exact opposite is true for the investment model. Because "price" is restricted below the market-clearing level, then by definition there are only periods of continuous excess demand in a financially repressed economy. Supply represents the shorter side of the market and consequently the quantity traded in the market is equivalent to the quantity supplied. If this is valid, then an application of a methodology based on disequilibrium econometrics will lead us to formulate and estimate a model of the following form:

$$ S_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 FS_t + \alpha_3 R_t + u_t, $$

rather than

$$ S_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 FS_t + \alpha_3 R_t - \frac{1}{\lambda} (\Delta R)^s_t + u_t. $$

Equation (8.30) is the appropriate investment function.

If $(\Delta R)^s_t$ is included in a savings model of a financially repressed economy it would be equivalent to zero or insignificant. Thus, it would not have much effect on the savings rate as already empirically indicated above. Our initial results thus far suggest that the financially repressed economy of Trinidad and Tobago is not only in disequilibrium but furthermore, it is in a state of continuous excess demand and insignificant excess supply.

This may also be the reason for the insignificant coefficient of the "price when excess supply exist" variable in the in the investment equation of the directional model and the significant coefficient or the "price when excess demand exist" variable in the in the saving equation. In a financially repressed economy there is no excess supply, hence it is no surprise that this coefficient is statistically in significant. Additionally, the continuous excess demand in a financially repressed economy ensures an estimate which is statistically significant.
8.5 A Disequilibrium Model Relevant to a Financially Repressed Economy

Based on the characteristics of a financially repressed economy a disequilibrium is reestimated as illustrated above. The results are presented below:

**Dependent Variable (S/Y)**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Dependent Variable</th>
<th>Coefficients</th>
<th>t-values</th>
<th>Std. Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) S/Y = 0.1807 +0.4614YG -0.5993FSY -0.00006GD -0.0053R_2</td>
<td>0.1209</td>
<td>+0.4755YG</td>
<td>-0.3662FSY</td>
<td>+0.081ODum</td>
<td>-0.0030R_2</td>
</tr>
<tr>
<td></td>
<td>(6.1298)</td>
<td>(4.108)</td>
<td>(5.470)</td>
<td>(4.236)</td>
<td>(-2.389)</td>
</tr>
<tr>
<td></td>
<td>R^2 =0.90</td>
<td>DW = 1.81</td>
<td>Reset F(1,24)=0.754</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B-J (\chi(2)) = 0.344</td>
<td>Het F(1,29)= 1.108</td>
<td>Chow F(2,25)=0.015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) S/Y = 0.1209 +0.4755YG -0.3662FSY +0.0810Dum -0.0030R_2</td>
<td>0.165</td>
<td>+0.4755YG</td>
<td>-0.3662FSY</td>
<td>+0.081ODum</td>
<td>-0.0030R_2</td>
</tr>
<tr>
<td></td>
<td>(4.818)</td>
<td>(2.534)</td>
<td>(-2.624)</td>
<td>(2.525)</td>
<td>(-1.585)</td>
</tr>
<tr>
<td></td>
<td>R^2 =0.89</td>
<td>DW = 1.67</td>
<td>Reset F(1,24)=2.301</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B-J (\chi(2)) = 1.165</td>
<td>Het F(1,29)= 0.1078</td>
<td>Chow F(2,25)=0.017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8.10

Estimates of the savings rate equation in the financially repressed economy using single stage estimation

**Dependent Variable (I/Y)**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Dependent Variable</th>
<th>Coefficients</th>
<th>t-values</th>
<th>Std. Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) I/Y = 0.1512 +0.6642YG +0.5314FSY -0.0041(\Delta R) -0.00004GD -0.0081R_1</td>
<td>0.1075</td>
<td>+0.5116YG</td>
<td>+0.6871FSY</td>
<td>-0.0030(\Delta R)</td>
<td>+0.00742Dum -0.0051R_1</td>
</tr>
<tr>
<td></td>
<td>(5.969)</td>
<td>(4.619)</td>
<td>(4.236)</td>
<td>(-2.389)</td>
<td>(-3.474)</td>
</tr>
<tr>
<td></td>
<td>R^2 =0.73</td>
<td>DW = 1.91</td>
<td>Reset F(1,25)=1.026</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B-J (\chi(2)) = 3.536</td>
<td>Het F(1,30)= 0.245</td>
<td>Chow F(2,26)=0.203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) I/Y = 0.1075 +0.5116YG +0.6871FSY -0.0030(\Delta R) +0.00742Dum -0.0051R_1</td>
<td>0.162</td>
<td>+0.5116YG</td>
<td>+0.6871FSY</td>
<td>-0.0030(\Delta R)</td>
<td>+0.00742Dum -0.0051R_1</td>
</tr>
<tr>
<td></td>
<td>(3.727)</td>
<td>(2.684)</td>
<td>(4.398)</td>
<td>(-2.425)</td>
<td>(2.277)</td>
</tr>
<tr>
<td></td>
<td>R^2 =0.65</td>
<td>DW = 1.68</td>
<td>Reset F(1,25)=0.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B-J (\chi(2)) = 1.462</td>
<td>Het F(1,30)= 0.718</td>
<td>Chow F(2,26)=0.026</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8.11

Estimates of the investment rate equation in the financially repressed economy using single stage estimation
Table 8.12
Estimates of the savings rate equation in the financially repressed economy using two stage estimation

<table>
<thead>
<tr>
<th>Dependent Variable (S/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) S/Y = 0.1822 +0.4217YG -0.6052FSY -0.00004GD -0.0052R^2</td>
</tr>
<tr>
<td>(6.554) (3.710) (-4.522) (-2.710) (-2.286)</td>
</tr>
<tr>
<td>R^2 =0.90 DW = 1.46 Reset χ(1) =0.104</td>
</tr>
<tr>
<td>B-J (χ(2)) = 0.310 Het Fχ(1) = 0.066</td>
</tr>
<tr>
<td>(2) S/Y = 0.1048 +0.4147YG -0.6098FSY -0.00005GD -0.00332R^2 +0.00004YP</td>
</tr>
<tr>
<td>(2.9789) (4.153) (5.594) (-3.493) (-1.628) (2.2803)</td>
</tr>
<tr>
<td>R^2 =0.92 DW = 1.52 Reset χ(1) =1.254</td>
</tr>
<tr>
<td>B-J (χ(2)) = 3.266 Het Fχ(1) = 1.163</td>
</tr>
</tbody>
</table>

The savings model is re-estimated without the disequilibrium variable (to represent excess supply) since it was found to be insignificant in previous models. The results of these models show that there is no reduction in the performance. The explanatory power of some of the models have increased. Also the diagnostics seem to have improved. In the investment equation the variable to represent excess demand is negative and significant whether OLS or 2SLS is the relevant estimation procedure. Based on there is more evidence to indicate the presence of excess demand rather than excess supply.
The signs of the $\Delta R$ variable in the quantitative models must also be examined. The coefficient of $(\Delta R^e_i)^{\alpha}$ in the supply equation is negative. As suspected an inconsistency arises, i.e. $\alpha_3$ and $\frac{1}{\lambda}$ in the supply equation are not positive and negative respectively as expected. Instead both coefficients are negative. A justification of this conflict is possible if we were to consider the results found earlier when the dummy variables represented the financial repression proxy. These results inferred that while severely negative rates did not encourage savings, moderately negative rates could raise savings. A rise in the interest rate does not increase savings because the increases are too small to eliminate financial repression and savers are still not encouraged to deposit additional savings in financial institutions. However if the increases are large enough to eliminate financial repression or reduce it to a reasonably low level then a rise in savings would follow. In other words, while a mere increase in the interest rate is not enough to stimulate savings a substantial upward jump may be enough to attract larger deposits. With respect to the investment equation, the disequilibrium variable $(\Delta R^d_i)^{\beta}$ is consistent with a priori expectations.

8.6 Conclusions
The current results (with respect to the directional relationships between the real interest and savings and investment) present no major incongruities with those obtained when the cointegration methodology was employed in Chapters Five and Six. The real rate of interest has a negative impact on both the savings and investment rate in spite of the type of model or the estimation procedure be it ordinary least squares, two stage least squares estimation or Zellner's seemingly unrelated regression. Once again it was observed that in the financially repressed economy higher real rates of interest do not assist in the mobilisation of savings nor do they serve to boost the investment rate by increasing the availability of savings.

Employing the disequilibrium methodology provides other important insights, for example the market was found to be in a state of disequilibrium. This disequilibrium was exhibited through, excess demand for investment and no excess supply of loanable funds. Where included the disequilibrium variable to represent excess supply was in all instances found to be statistically insignificant. While the excess demand variable was always significant. This was no surprise since the characteristics of the financially repressed economy allowed us to anticipate a situation where there is excess demand for investible funds and no excess supply of loanable funds. As a consequence of this models were re-estimated to exclude the excess supply variable.
An application of disequilibrium econometrics to an economy provides a scientific foundation from which we can examine the presence of the characteristics which typify a financially repressed. Based on the evidence in this chapter we can conclude that the economy of Trinidad and Tobago is a financially repressed one with excess demand for investment and no "significant" excess supply of loanable funds.

Three additional variables have been incorporated in the basic model. Disposable income as an explanatory variable in the savings model, real per capita income and real credit to the private sector. Where included all variables have a positive impact on the savings and investment rates. Disposable income has been utilised in an attempt to preserve the identification of the simultaneous model without reducing its performance. Similarly the other two variables have been included because of their economic relevance to the model. When included in the investment model real credit to the private sector is significant at the 10% level. Real per capita income appeared to be statistically insignificant when incorporated in the investment rate model, however significant at the 5% when included in the savings model. The dummy variable which has been incorporated in an attempt to take into consideration the oil boom was significant when included in both savings and investment models. As expected real government debt exerted a negative and significant impact on the savings and investment rate.
CHAPTER NINE

Conclusion

This thesis has sought to test the hypothesis of financial repression in context of the economy of Trinidad and Tobago over the period 1960-1991, using several alternative proxies for financial repression. It has been shown that financial repression is characteristic of the Trinidad and Tobago economy, given that real interest rates were negative over most of the sample period under consideration. In addition, the application of disequilibrium econometrics technique indicated that while excess demand for loanable funds was important, there was no significant excess supply of savings. This confirms the existence of conditions which characterise a financially repressed economy.

The strength of the financial repression proxy was partly determined by the manner in which it was measured. Generally the proxies of the real interest rate and inflation suggest that financial repression does not deter savings and investment, while all other proxies used indicated to the contrary, that is when measured by commercial bank reserves; dummies (to distinguish different degrees of financial repression); the difference between the domestic and foreign real interest rate; and the overvaluation of the domestic currency, financial repression can discourage the accumulation of savings, act as a disincentive to investment and impede economic growth.

The effect of financial repression on savings is weak and in some cases suggests a rejection of the McKinnon-Shaw hypothesis. Higher interest rates and lower inflation, albeit insignificant, do not serve to increase savings. The result with respect to the former is not categorical since the inference based on the utilisation of the dummy variable is that while severe levels of financial repression (rates less than -5 percent) impede savings moderate levels do not. An investigation of all other proxies reveal that the financial repression hypothesis cannot be rejected. Although they infer that lower levels of financial repression are associated with higher savings rate their influence is statistically insignificant.

In terms of the investment model, a higher level of financial repression, as proxied through dummy variables; commercial bank reserves; domestic-foreign interest rate differential; overvaluation of the currency, acts as a deterrent to higher investment rates. As in the results for the savings model, the financial repression theory can be rejected, based only on the results for the real interest rate and inflation. Both proxies clearly indicate that a lower degree of financial repression does not stimulate a higher investment rate. Based solely on these results the policy implication is not one of
liberalisation. Although the influence of both proxies are significant in the aggregate investment model, the result of the dummy variable reduces the validity of this recommendation with respect to the real interest rate. The results for the investment model also indicate a rejection of McKinnon’s Complementariy Hypothesis in favour of Shaw’s Debt Intermediation View. In Trinidad and Tobago savers may not necessarily be investors, and investors do not have to preface their investment with savings. Instead they can approach financial intermediaries for financial assistance in undertaking projects.

Despite the mixed results on the relationship between financial repression and savings and investment there is consistent evidence to suggest that financial repression constrains economic growth in Trinidad and Tobago. The policy recommendation based on the empirical findings for all proxies are in favour of liberalisation. Higher interest rates, lower inflation, a reduction in the gap between domestic and foreign interest rate, a reduction in the gap between the black-market and the official exchange rate and less exchange rate misalignment should contribute to stimulating higher growth levels in the long run. It seems that while higher interest rates and lower inflation level cannot increase savings and investment, it can positively influence economic growth.

If the interest rate is the only medium through which financial repression is measured, then, there is evidence to reject the financial repression hypothesis and the policy recommendation is not one of liberalisation. While it does not increase savings and investment its impact in growth although positive in the long run is negative in the short run. The validity of this argument is reduced when dummy variables are the relevant proxy for financial repression. It is further reduced when the results of the domestic-foreign interest rate differential proxy are analysed. A reduction in this gap increases the savings and investments rates and economic growth. In other words by either increasing the real domestic interest rate or reducing the real foreign rate the economy can grow.

When the definition of financial repression is extended there is additional evidence to support liberalisation policies. Distorted prices in the external sector acts an impediment to economic growth. The more misaligned is the domestic currency and the greater the difference between the black-market and the official exchange rate the bigger will be the adverse impact on savings, investment and economic growth. When analysed on its own without consideration for the internal developments the policy implication based on these results are unequivocal. Constraints on the exchange rate should be removed, that is a devaluation should be undertaken. As mentioned in earlier chapters the domestic currency has been devalued in 1985 and 1988. A further devaluation took place in 1993 after which the exchange rate has been allowed to follow
a dirty float. However, insufficient time has elapsed for any strong conclusions to be made.

Table 9.1 attempts to summarise the policy implications. Proxies for financial repression are given in the rows and economic indicators are given in the columns. An x indicates that liberalisation through the relevant proxy would not contribute to increasing the specific economic indicator, for example, liberalisation through proxy one (real interest rate) would not increase savings but would increase economic growth. On the other hand a tick √ indicates the likely success of financial liberalisation policies.

<table>
<thead>
<tr>
<th></th>
<th>Savings</th>
<th>Investment</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Interest Rate</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>Dummy Variables</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Reserve Requirement</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Rate of Inflation</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>Interest Rate Differential</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Overvaluation of Domestic Currency</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

Table 9.1
Summary table to indicate whether liberalisation would increase savings, investment and growth

In conclusion, on the basis of this research, the McKinnon-Shaw hypothesis on financial repression cannot be rejected. However the results when inflation and real interest rates are the relevant proxies as well as the low significance levels of other proxies ought to serve as warning signals to illustrate that liberalisation cannot be seen as the complete answer towards improving the economy. While a little financial repression may not be harmful, severe financial repression may be detrimental. It is imperative that the government of Trinidad and Tobago not follow the example set by
its' neighbours in the South and Central American economies. These countries implemented intensive liberalisation policies over a relative short period, only to face immense economic difficulties (Diaz-Aleandro, 1985). Hence if there is a desire to undertake adjustment in this direction it should be a gradual one without too much intensity of policies so as to avoid moving from one extreme market position to another.
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