

POLITICAL RISK AND CAPITAL FLIGHT IN SOUTH AFRICA

by

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DEDICATION

This thesis is dedicated to my parents, whose love, encouragement and support saw me through all my studying years.

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Firstly, I wish to express my sincere thanks to my supervisor Dr. Richard Simson for his time and effort in reading and correcting various drafts of this thesis.

Secondly, I am grateful to my parents for their great personal sacrifice to ensure that I receive the highest possible education.

DECLARATION

I wish to acknowledge that this thesis, except where specifically indicated to the contrary in the text, is entirely my own work and has not been submitted at any other University.



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ABSTRACT

Developing countries have low levels of capital. They are usually net borrowers, supplementing their low domestic savings with external finance. During the 1970s and 1980s many developing countries borrowed from international financial institutions on a large scale. Surprisingly, private citizens of these developing countries were investing in foreign assets at an increasing rate. This observation raised a great deal of interest among academics, policy-makers and the general public concerning capital flight from developing countries.

Some of the effects of capital flight on the domestic economy of a developing country are as follows: Firstly, capital flight causes a reduction in available resources to finance domestic investment. This leads to a decline in the rate of capital formation and adversely affects the developing country's economic growth rate. Secondly, capital flight reduces the government's ability to tax all the income of its residents because the government experiences difficulty in taxing wealth held abroad as well as income that is generated from that wealth. Capital flight thus reduces government revenues and the ability to service external debt. Thirdly, as the government revenues fall with the erosion of a tax base there is an increased need to borrow from international financial institutions thereby increasing the foreign debt burden.

Capital flight conforms to the portfolio allocation theory, which states that capital flows are determined by rates of return and risk. Capital flows respond positively to higher rates of return and negatively to risk. The present study investigates the effect of political risk on the magnitude of capital flight in South Africa over the period 1960-1995. South Africa is a good test case because the country experienced high political risk and capital flight for many of the years between 1960 and 1995.

We replicate the Fedderke and Liu's study (1999) by recollecting the data from original sources. After conducting tests for cointegration we estimate the impact of political risk measured by a political instability index on capital flight. We find support for the hypothesis that higher instability results in greater capital flight. This is the result we are able to replicate thus supporting Fedderke and Liu. We also use our results to show how capital flight can depreciate the exchange rate. Finally we point to some possible policy implications.

CHAPTER 1

GENERAL INTRODUCTION

1.1. Introduction

Many developing countries have low levels of capital. This predicament forces them into heavy borrowing from international financial institutions in order to supplement their low domestic savings. "Developing countries typically face constraints on both the level of domestic savings available for domestic investment and the amount of foreign exchange available for imports." (Bank of England 1989:366).

During the 1970s and early 1980s many developing countries borrowed heavily from international financial institutions. Surprisingly, private citizens of these developing countries were investing in foreign assets at an increasing rate. Alesina and Tabellini (1989:1999) explain that the public sectors of many developing countries were accumulating large external debts during the 1980s, at the same time the private sectors of those same countries were accumulating large quantities of external assets.

Studies by Lessard and Williamson (1987), Dooley and Kletzer (1994) show that in the aftermath of the 1982 international debt crisis economists were surprised to learn that a large part of the borrowing of developing countries from international commercial banks was not matched by net imports of goods and services, but was instead matched by unrecorded private capital outflows from developing countries.

This observation led to a great deal of interest among academics, policy-makers and the general public concerning capital flight from developing countries.

Capital flight has been defined in several ways by various authors. According to Smit and Mocke (1991:101), some authors define capital flight as all private capital outflows from developing countries. Other authors define capital flight as only the short-term illegal capital outflow. The major factor preventing consensus on a definition of capital flight appears to be the difficulty involved in distinguishing between normal capital outflow and "flight" capital flow (Gordon and Levine 1989).

There is no general agreement on what exactly is meant by capital flight. Hermes and Lensink (2001:3) show that in some studies it is suggested that capital flight should be distinguished from normal capital outflows. According to these studies normal outflows are based on considerations of portfolio diversification of residents, or activities of domestic commercial banks aiming at acquiring or extending foreign deposit holdings. In their view, the phenomenon of capital flight is related to the existence of extremely high uncertainty and risk with respect to returns on domestically held assets. Residents liquidate their domestic assets and remove their wealth from a country in order to avoid extremely high losses of their domestic assets. Capital flight is motivated by the fear of losing wealth due to, for example, expropriation of wealth by the government, political instability, exchange rate overvaluation, non-repayment of government debts, capital controls, financial market regulations and tax policies.

According to Fedderke and Liu (1999:2), normal outflows might include those resulting from private investors' attempts to diversify their international portfolio holdings to maximize returns. They also include enterprises which promote trade via providing export credits, accumulating working balances abroad and then investing directly in the acquisition of productive capital abroad. Domestic commercial banks accumulating deposits with foreign banks and acquiring claims on non-residents through portfolio and direct investment are also included in the definition of normal capital outflows. The difficulty is to obtain a characterization of capital flight which captures abnormal capital movements as distinct from the normal flows.

According to the Bank of England (1989:364), it is difficult to distinguish those resident outflows which appear damaging to the domestic economy of a developing country from those that would be associated with the normal process of growth and diversification of the portfolios of resident investors in response to changes in risk and expected returns.

However, most of the definitions of capital flight in the literature depend on the notion of money that flees from abnormal risk in a domestic economy (Deppler and Williamson 1987, Dooley 1988, Walter 1987, and Kindleberger 1987). According to Fedderke and Liu (1999:4), this concept of capital flight argues that, while normal capital movements are related to trade financing, domestic investment and debt-servicing, capital that flees is not available for these purposes.

In addition, a Bank of England report (1989:364) shows that flight capital might be regarded as a response to abnormal risk in the domestic economy or a desire to place assets beyond the control of local authorities. Such a definition suggests that much of the capital flight should be seen as a response to inappropriate macroeconomic and structural policies.

Further, Lensink *et al.* (1998:1-2), define capital flight as capital which flows out of the country due to the existence of high uncertainty and risk with respect to returns on domestically held assets. Residents liquidate their domestic assets and remove their wealth from a country in order to avoid extremely high expected losses on their asset holdings. Residents decide to invest their wealth abroad due to an adverse domestic investment climate, or because economic agents consider it too risky to maintain domestic investments. This adverse domestic investment climate may be caused by overvalued exchange rates, high domestic inflation rates, government budget deficits, as well as by an interest rate differential between domestic and international interest rates. These variables measure economic aspects of the adverse domestic investment climate.

According to Deppler and Williamsom (1987:39-59), it is sometimes argued that capital outflows based on risk considerations should be viewed as abnormal and should therefore be distinguished from normal capital outflows, since normal capital outflows are based on considerations of portfolio diversification of residents or activities of domestic commercial banks aiming at acquiring or extending foreign deposit holdings. Yet, when measuring capital flight, it appears to be very difficult to empirically distinguish between normal and abnormal capital outflows.

Political risk is also very important in explaining capital flight. According to Lensink *et al.* (1998:1-10), political risk refers to the possibility that political decisions, conditions or events in a country will affect a business climate in such a way that investors will lose money, or they will not make as much money as they expected when the investment was made. Political risk arises either from government legislation or policies such as nationalization policies, oppressive laws or absence of political freedom for some sections of the population, which make the oppressed masses rise up against the oppressive government, leading to violent demonstrations and other similar events. These events have a negative impact on the economy's investment climate. General forms of political risk are usually violent events, such as large-scale protest movements, military coups, assassinations, riots, strikes, terrorist activities, civil wars and other similar activities. Residents who are faced with such instability and uncertainty take their money out of the country to avoid the possibility that the government may erode the future value of their asset holdings (Alesina and Tabellini 1989, Tornell and Velasco 1992, Bhattacharya 1999, Lensink, Hermes and Murinde 2000).

For the purposes of the present study a definition of capital flight as money that flees from economic and political risk in the domestic economy will be used because it fits in well with the economic theory used in the study.

The effects of capital flight can be categorized into short-run effects and long-run effects. According to Khan and Haque (1988:42), capital flight results in serious economic problems for domestic authorities, as well as for ordinary citizens living in a developing country. A sudden increase in the outflow of capital can have destabilizing effects on domestic interest rates, exchange rates and the country's international reserves position. The outflow creates a shortage of liquidity in the economy which, in turn, pushes interest rates higher. This negatively affects physical investment in the country. A capital outflow also tends to depreciate domestic currency under a floating exchange rate regime. This thesis attempts to measure this effect in a crude but informative manner. On the other hand, if the central bank is committed to defending a particular exchange rate, it depletes its reserves. In either case, capital flight causes short-run adjustment problems for the monetary authorities. Moreover, when a country is facing a balance of payments crisis, or is heading towards one, and immediate corrective action is not taken, residents of the country, foreseeing the possibilities of increasing exchange controls and other measures, are likely to increase the rate of capital flight. Thus, at the very time that increased capital inflows are required by the policy- and decision-makers in the government, capital flight ends up aggravating the crisis.

In addition, Khan and Haque (1988:42) showed that there are several long-run effects of capital flight on the domestic economy. Firstly, capital flight causes a reduction in available resources to finance domestic investment, leading to a decline in the rate of capital formation, and adversely affecting the country's economic growth rate. Secondly, capital flight reduces the government's ability to tax all the income of its residents because governments experience difficulty in taxing wealth held abroad as well as income that is generated from that wealth. Capital flight thus reduces government revenues and the ability to service external public debt. Thirdly, as government revenues fall, with the erosion of the tax base, there is an increased need to borrow from abroad, thereby increasing the foreign debt burden.

Political situations played a major role in affecting capital movements in South Africa. According to Padayachee (1995:168), during the period 1957-1972 there was reasonable political stability in South Africa, which led to a huge influx of foreign capital into the South African economy. These inflows were mainly Foreign Direct Investment (FDI), which contributed to the growth of the South African economy during the 1957-1972 period by facilitating the transfer of sophisticated technology from the USA and the UK. About 60 *per cent* of the increase in GNP over the period 1957-1972 was due to technological change and roughly two-thirds of this technological change was technology incorporated in foreign investment. In this period, GNP increased by 4.8 *per cent* per annum, of which foreign investment accounted for 3.2 *per cent*.

Conversely, political instability which existed in South Africa during the late 1970s to 1980s negatively affected capital flows which, in turn, led to an increased rate of capital outflows. Padayachee (1995:169-170) explains that political instability reduced investors' confidence and this led to capital flight, hence reversing the positive flows which prevailed in previous years. Disinvestment resulted in an outflow of US \$ 0.5 billion between 1985 and 1989, with the USA, UK and other countries selling off their South African holdings and moving out of the country.

According to Stoneman and Thompson (1991:223), political uncertainty made South African companies shift their investments from South Africa to Europe. The worsening political situation meant even creditor nations and institutions were under pressure from civil rights movements abroad to impose economic sanctions on South Africa. "South Africa was completely cut off from accessing long-term debt capital. Between 1985 and 1988 most forms of foreign capital inflows dried up altogether" (Garner and Leape 1991:13). This can be shown in Table 1.1.

Table 1.1. Net capital flows to South Africa 1985-1990 (rand million)

Years	1985	1986	1987	1988	1989	1990	1991
Long term capital flows	-522	-3162	-1701	-1173	-1230	-1945	-2706
Short term capital flows	-7799	-1910	-1150	-5035	-3115	-929	-3345
Total capital flows	-8321	-5072	-2851	-6208	-4345	-2874	-6051
Net capital flow as a percentage of GDP		-6.8	-3.6	-1.7	-3.1	-1.9	-1.1

Source: Oden (1993: 223).

In Table 1.1 , it is seen that the period 1985-1991 was characterized by both long-term and short-term capital outflows. The largest total capital outflows occurred in 1985, 1986, 1988 and 1991. Adverse domestic political factors constituted a primary cause of capital outflows from South Africa. The data in Table 1.1 substantiate this view, namely that capital outflows were concentrated in the period characterized by major political upheavals as opposition activity against the *apartheid* regime intensified. According to an IMF report (1995:40), foreign capital played an important role in funding investment in South Africa during the period 1960 -1985. In the face of changes in the level of national saving, foreign capital responded in a manner that enabled South Africa to maintain its investment path. In contrast, between 1986 and 1993, the steady rate of capital outflows constrained investment. The ending of *apartheid* offered an opportunity for foreign capital flows to return to the position they played for the 25 years prior to 1986, when foreign capital was a source of financing investment in South Africa.

South Africa is a good case study for analysing the effects of political risk on capital flight, because the country experienced both political instability and stability over the period 1960-1995. South Africa went through its period of transformation from 1994 onwards; a period also characterized by both stability and instability. Thus the political risk which negatively affects capital flows in South Africa has not been completely eliminated. Against this background, the present paper aims to explore the effects of political risk on the magnitude of capital flight in South Africa from 1960 to 1995, since this is the period in which there was high political risk in South Africa. Rather than solving the debate over

what exactly is capital flight and political risk, we adopt the two measures of each (making four in total) used in the literature covering capital flows and political consideration.

1.2. Purpose

The purpose of the present research is fourfold:

- To review the trends of political risk and capital flows in South Africa from 1960 to 1995 (see section 2.8, page 30-42).
- To assess the relationship between measures of political risk and capital flight in South Africa in order to empirically test the hypothesis that either political instability or lack of political freedom leads to an increase in the magnitude of capital flight (see section 3.5, page 67-70).
- To make some attempt to link the current exchange rate depreciation to the magnitude of capital flows (see section 3.8, page 78-81).
- Finally, to provide recommendations on the best policies for attracting capital flows to South Africa (see page 84).

1.3. Research design

This thesis proposes to use two approaches in order to measure capital flight, as the literature contains a number of different concepts of what exactly capital flight is.

The first approach is the balance of payments method proposed by Cuddington (1986). In this approach capital flight is defined as the sum of private, short-term capital outflows plus errors and omissions (statistical discrepancy) in the balance of payments statistics. The aim is to focus on short-term "hot money" flows. Errors and omissions reflect unrecorded short-term capital flows. This approach of measuring capital flight is chosen because it gives a measure of short-term capital outflows which go unrecorded due to their illegal nature,

hence giving a good approximation for so-called “flight” capital. According to Lensink *et al.* (1998:3), this measure reflects the idea that capital flight goes unrecorded due to the illegal nature of these capital movements. It is argued by the proponents of this method that the unrecorded capital movements appear in the net errors and omissions. Moreover, by concentrating on short-term flows, long-term outflows are excluded, which are more normal in character. So the balance of payments method measures “flight” capital, which are capital flows beyond what normally would have been the case.

The second approach is the indirect method proposed by the World Bank (1985), Erbe (1985) and Morgan Guaranty (1986). This approach measures capital flight indirectly from the balance of payments statistics by comparing the sources of capital inflows with the uses of these flows by a country. Source funds consist of an increase in recorded external debt and net inflow of foreign direct investment (FDI), which, in turn, are used to finance current account deficits or increase official reserves. The measure adds the increase in external debt and inflows of foreign direct investment and then subtracts the sum of the current account deficit and the increase in official reserves. If the sources exceed the uses of capital inflows, the difference is termed capital flight. This approach of measuring capital flight is chosen because it measures both the short-term and long-term capital outflow as capital flight, hence acknowledging the difficulty of separating “flight” capital from normal capital outflow. “This approach acknowledges the difficulties of separating ‘flight’ capital from normal capital outflows and, therefore, measures all private capital outflows as capital flight.” (Lensink *et al.*, 1998:3).

Table 1.2 below gives an example of how capital flight is measured by using the indirect method. The data used is that of South Africa, covering the period 1980 to 1990. A positive sign indicates an outflow of capital, while a negative sign indicates an inflow of capital. In Table 1.2 below we see that South Africa experienced a brief period of capital inflow during 1981 and 1982 due to the gold price boom which attracted capital into the country, while for most of the 1980s South Africa experienced capital outflows due to the high political risk which prevailed in the mid-1980s to early-1990s. To calculate

capital flight in the final column of Table 1.2, we add column 2 and 3 and subtract the sum of column 4 and 5.

Table 1.2 An indirect approach to capital flight for South Africa 1980-1990.

Year	Foreign debt (US\$ mill.)	FDI (US\$ mill.)	Current account deficit (US\$ mill.)	Reserves (US\$ mill.)	Capital flight indirect measure (US\$ mill.)
1980	849.2328	19	-3426.45	786.1776	3508.502
1981	962.8134	-121	4365.59	-1052.72	-2471.06
1982	2247.493	-338	3304.809	851.9847	-2247.3
1983	1901.962	-69	350.2752	880.5984	602.088
1984	1904.868	-435	1268.065	-447.878	649.6814
1985	1897.132	449	-2036.33	-483.276	4865.736
1986	1645.136	53	-2898.22	-528.074	5124.434
1987	1174.241	75	-3476.09	976.807	3748.52
1988	1009.019	-116	-1422.89	-706.608	3022.517
1989	801.6119	-8	-1367.04	547.6827	1612.967
1990	690.654	5	-2077.42	342.9858	2430.093

Source: IMF Balance of Payments Statistics Yearbooks 1970-2000.

IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

SARB Supplement to Quarterly Bulletin 1994.

In order to determine the magnitude of capital flight from South Africa, the obvious procedure would be to select the best of these two measures and apply it to South African data. Unfortunately there is no consensus on which of the two methods of measuring capital flight provides the best measure. Moreover, all of these measures are in some or other respect deficient in measuring capital flight. We use both. In fact this thesis provides some evidence to support the use of the indirect measure of capital flight.

According to Fedderke and Liu (1999:5-6), disadvantages of the balance of payments approach include its failure to account for flight in the form of the acquisition of long-term financial and real assets, leading to an understatement of capital flight. Moreover, the problems of trade misinvoicing and smuggling are neglected by the balance of payments approach. Trade misinvoicing could either underestimate a current account surplus or

overestimate a current account deficit, hence distorting the errors and omissions component. The indirect approach neglects the problems of trade misinvoicing and smuggling, which may lead to the underestimation of the real magnitude of capital flight. The indirect measure does not distinguish between normal and “flight” capital movements. A large value of the indirect measure may simply indicate large trade-financing capital outflows and not capital fleeing the economy which might lead to an overstatement of the real magnitude of capital flight.

Consequently, the approach followed in this study is to estimate *both* measures with South African data in order to provide a range of estimates for the magnitude of South African capital flight.

Political risk is measured by a political freedom index and a political instability index, as proposed by Fedderke, de Kadt and Luiz (1999). According to Fedderke, de Kadt and Luiz (1999:22), the political instability index was constructed on the basis of official and unofficial sources which were placed in a weighted composite index of instability, in accordance with alternative weights.

The following components were included in the political instability index for South Africa:

- The number of prosecutions under Defence Acts and Emergency regulations.
- The number of prosecutions for faction fighting.
- The number of people proscribed or banned under the Suppression of Communism Act.
- The number of people placed in detention.
- The number of political fatalities.
- The number of organizations officially banned.
- The number of actions against riots.
- Declarations of official states of emergency.
- The number of publications subjected to censorship.

This index can vary from 0 to 35000. Higher scores indicate higher political instability while lower scores indicate lower political instability. Fedderke, de Kadt and Luiz (1999:24) show the index peaks during periods of repressive activity in South Africa, such as occurred during 1976 and the mid-1980s, when there was a strong opposition activity against the *apartheid* system. Thus these years are characterised by high scores on the political instability index.

In addition, the components quoted below from Fedderke, de Kadt and Luiz (1999:7) were included in the political freedom index for South Africa:

- An electoral system with a universal adult franchise in which there is no exclusion from participation on the grounds of race, colour, creed or sex and in which free and fair elections take place on a regular and precisely determined basis.
- Constitutionally guaranteed freedoms of expression, political association and assembly.
- Constitutionally guaranteed freedom of religion and freedom of choice with respect to personal matters such as vocation and sexual orientation.
- Constitutional provisions to check and exclude arbitrariness and discrimination in the application of laws.
- Legally entrenched freedom of movement and the right to reside in an area of choice within the territorial boundaries of the relevant polity.
- A free press constrained only by the laws of libel and defamation and a very precisely defined and limited constraint with respect to matters of national security.
- A Bill of Rights, or some equivalent, being a constitutionally robust mechanism whereby the rights of individuals can be effectively protected.
- A division of powers between the executive, judicial and legislative branches of government.

The scale for political freedom index ranges from 0 to 200. A score of 200 represents a system of liberal democracy and the most extensive system of personal liberties for all members of the society. A score between 0 and 25 would be indicative of a totalitarian

state of the type exemplified by, say, Nazi Germany.

These indices attempt to measure political risk as perceived by investors. In this thesis similar measures are constructed in order to test empirically whether there is a relationship between capital flight and both measures of political risk.

The key question in this thesis is, does political risk lead to an increase in the magnitude of capital flight? This question is answered by replicating Fedderke and Liu's study but constructing the data anew. This framework is chosen because Fedderke and Liu (1999:29) conclude that capital flows for South Africa show a strong sensitivity to political risk. High political instability and political liberalization in South Africa both served to stimulate capital outflows. This finding by Fedderke and Liu (1999) prompted the researcher to replicate their study in order to determine whether or not their results stand up to scrutiny. We find political instability is the more important factor in capital flight.

The confirmation of research findings through replication by other researchers is essential to progress in economic science. A study by Broad and Wade (1983) shows that the inability of other researchers to replicate published scientific findings revealed both inadvertent errors and sometimes outright fraud in the reported findings. It is widely recognized by researchers that inadvertent errors occur in empirical economic research and appear in published empirical articles. The results obtained from the Dewald *et al.* study (1986) suggest that such errors appear to be a commonplace rather than a rare occurrence. Thus replication becomes an important part of the scientific methodology in correcting and unifying the findings of various researchers into a defensible and coherent body of knowledge.

There has been a reluctance on the part of many researchers to conduct replication studies. A study conducted by Kuhn (1983) shows that replication - however valuable in the search for knowledge - does not fit within the "puzzle-solving" paradigm which defines the reward structure in scientific research. Researchers are not rewarded for replicating another researcher's findings. Furthermore, a researcher undertaking a replication may

be viewed as lacking imagination and creativity, or of being unable to allocate his/her time wisely among competing research projects. In addition, replications may be interpreted as reflecting a lack of trust in another researcher's integrity and ability, or as a personal dispute between researchers. Finally, ambiguities or errors in the documentation of the original research may leave the researcher unable to distinguish between errors in the replication and in the original study. Months of effort may yield the replicator only inconclusive results regarding the validity of the original study and thus no foundation for his/her future research in the area. These circumstances lead to a reluctance to undertake replication studies.

Despite the unpopularity of replication in empirical economics, it is still an essential part of any scientific methodology. "Only through replication of the results of others can scientists unify the disparate findings of various researchers in a discipline into a defensible, consistent, coherent body of knowledge"(Dewald *et al.*, 1986:600).

Thus, despite the unconventional format chosen in this thesis, the Dewald *et al.* study reveals that replication is indeed a valid alternative to the conventional methodology of original economic research which involves economic theory, data collection and empirical analysis.

1.4. Conclusion

Capital flight is a major problem for many developing countries. Since developing countries have low levels of savings, capital fleeing from developing countries represents a threat to the economic growth of these developing countries as it drains away the much-needed resources for economic growth and can result in large changes in the exchange rate. This thesis investigates the effect of political risk on the magnitude of capital flight in South Africa since South Africa experienced political instability and capital flight over the period 1960-1995. This investigation will be achieved by replicating Fedderke and Liu's study (1999), but reconstructing the data from scratch.

This thesis is organized as follows. Chapter 2 reviews the literature on political risk and capital flight and provides the economic model to be estimated later in this study. A review of the trends and causes of capital flight from South Africa is given in Chapter 2. Chapter 3 deals with the empirical results and provides a discussion of the results. Chapter 4 gives policy recommendations and a general conclusion.

CHAPTER 2

LITERATURE REVIEW: POLITICAL RISK AND CAPITAL FLIGHT

2.1. Introduction

Existing literature on capital flight does not give a systematic theoretical framework for empirical analysis of the impact of political risk on capital flight. Several studies in the literature have dealt extensively with the determinants of capital flight, such as exchange rate risk, high domestic inflation rates, government budget deficits and interest rate differentials between foreign and domestic assets, but little information is available that gives a consistent theoretical framework for analyzing the impact of political risk on capital flight. "What is amazing, therefore, is that in the literature on capital flight there has been no systematic investigation on the impact of political factors on the extent of capital flight" (Lensink *et al.*, 1998:1). Chapter 2 reviews the literature on political risk and capital flight and discusses the economic model which will be estimated in this thesis. A review of the trends and causes of capital flight from South Africa is also given in this chapter.

2.2. A theoretical framework for political risk and capital flight

The theoretical framework in this thesis treats capital flight as a portfolio choice. This is because, in terms of portfolio theory, capital inflows and outflows are caused by two factors, namely rates of return and risk. There are two types of risk, namely economic risk and political risk. According to Lensink *et al.* (1998:1-10), economic risk refers to the adverse domestic investment climate which may be caused by overvalued exchange rates, high domestic inflation rate, lower domestic interest rate as compared to foreign interest rate and government budget deficits. This adverse investment climate may lead to extremely high losses on domestic assets and residents liquidate their domestic assets and remove their wealth from the country. Political risk refers to the possibility that political decisions, conditions, or events in a country will affect a business climate in such a way that investors

will lose money, or they will not make as much money as they expected when the investment was made. Political risk arises either from government legislation or policies such as nationalization policies, absence of political freedom for some sections of the population, oppressive laws and from the acts of members of a society which have a negative impact on the economy's investment climate. General forms of political risk are usually violent events such as large-scale protest movements, military coups, assassinations, riots, strikes, terrorist activities, civil wars and other similar activities. Residents faced with political risk liquidate their domestic assets and remove their wealth from the country to avoid the high losses that may occur. We use risk and return as a starting point to construct our specified equation for estimation.

Studies by Eggerstadt, Brideau, Hall, Wijnbergen (1995) and Collier, Hoeffler, Patillo (1999) show that capital flight arises from portfolio diversification incentives, return differential incentives and relative risk incentives. Capital flight responds positively to higher rates of returns and negatively to risk factors and lower rates of return.

Indeed, the following quote from Fedderke and Liu is instructive: "In terms of portfolio allocation theory, normal capital flows and capital flight are both fundamentally driven by two classes of determinants - rates of return and risk factors, with positive responses to rates of return, negative responses to risk" (Fedderke and Liu 1999:10).

According to the studies by Cuddington (1986), Gibson and Tsakalotos (1993) and Lensink, Hermes and Murinde (1998), capital flight is directly related to the behaviour of a risk-averse individual who diversifies his/her wealth in order to maximize returns. These studies emphasize the decision to hold assets abroad as part of the process of portfolio diversification. Differences in rates of return between domestic and foreign asset holdings, as well as risk and uncertainty, influence this decision. Individual decisions with respect to portfolio diversification are influenced by macroeconomic instability, political instability and real interest rate differentials. We test empirically for these effects with equations 2.1 to 2.4 in section 2.7 (page 25-26).

In addition, Hermes and Lensink (2001:3) explain that the individual wealth holder compares expected rates of return of different domestic and foreign assets. The individual divides his or her wealth over domestic and foreign assets, taking into account portfolio diversification, rates of return differentials, and risk and uncertainty aspects.

Capital flight is thus a function of domestic rates of return, foreign rates of return and risk factors. Risk factors include economic risk and political risk. Lensink *et al.* (1998:1-2) show that economic risk includes exchange rate risk, high domestic inflation rates and government budget deficits which lower the returns of domestic assets. High domestic inflation rates or large exchange rate depreciations result in large losses on the real values of domestic assets as purchasing power of the domestic currency is eroded. Moreover, a large fiscal deficit financed by monetary creation stimulates both inflation and incentives for capital flight as investors attempt to prevent losses in the real value of their domestic asset holdings.

Political risk includes expropriation of assets by the government, wars, civil strife, repressive laws, absence of political freedom for some sections of the population which lead to political turmoil and instability, adverse changes in taxes, riots, protest demonstrations, political assassinations, deaths from violence, labour strikes and external threats or pressures such as economic sanctions. According to Khan and Haque (1985:606-628), political risk lowers the returns to domestic investment, hence creating an incentive for capital flight as capital moves across borders in response to international differences in rates of return and risk. Political risk lowers the returns to domestic assets as investors are faced with domestic political instability and uncertainty which may erode the future value of their asset holdings.

Capital flight which occurs simultaneously with foreign borrowing arises when foreign and domestic investors face an asymmetric risk of expropriation. This risk asymmetry means that domestic investors face higher risk of expropriation than foreign investors. Domestic investors faced with a higher risk of expropriation invest abroad and domestic investment is consequently financed with foreign borrowing. Expropriation includes things like nationalization of assets, domestic political instability, which might lower the returns to

domestic investment, capital controls by the government for domestic residents and a wide range of government regulations and taxes faced by domestic investors which erode the value of domestic financial assets and lead to capital flight. Capital flight causes a drain on domestic resources and generates demand for more foreign borrowing and results in higher domestic taxes by the government in order to finance its expenditures. The expected higher per capita tax liability for the assets which remain in the domestic economy further increases the incentives for further capital flight. Hermes and Lensink (2001:6) describe the problem in the following way: "When residents hold large amounts of foreign assets, the domestic tax base is reduced considerably. Under these circumstances, the tax burden due to increased public expenditures and foreign borrowing has to be shared by a smaller tax base, increasing the burden per unit of domestically held assets. Consequently, this will further stimulate residents to take their money and run out of the country."

2.3. Returns on domestic assets

According to Fernandez and Montiel (1996:58-59), returns on domestic assets are influenced by improved domestic government policies that increase a long-run expected rate of return or policies which reduce perceived risk on real domestic investment. Such policies could be major domestic structural and institutional reforms for increasing efficiency in the economy, improved domestic macroeconomic policies (especially successful inflation stabilization with sustainable fiscal adjustment) and short-run macroeconomic policy such as tight monetary policy that increases the expected rate of return on domestic financial instruments, resulting in higher domestic interest rates compared with foreign interest rates. Other policies include government policies that increase the openness of domestic financial markets to foreign investors, such as removal of capital controls and removal of restrictions on foreign direct investment. Any combination of these policies could operate simultaneously to influence domestic returns.

2.4. Returns on foreign assets

Returns on foreign assets are the interest rates on foreign assets. Since investors have to invest in either domestic or foreign assets, these foreign interest rates represent the opportunity cost of investing funds in the domestic economy. According to Hermes and Lensink (2001:6), capital flight may occur simply because returns on assets are higher abroad as compared to assets held domestically for an equivalent amount of risk. Thus capital flight can be explained by existing real interest rate differential.

Economic growth rates of foreign economies are also good proxies for returns on foreign assets and they, too, represent the opportunity cost of investing in the domestic economy. Fernandez and Montiel (1996:59) list the exogenous factors affecting the external opportunity cost of funds invested domestically. They are foreign interest rates, recessions abroad and easing of regulations affecting the access to capital markets in creditor countries.

2.5. Macroeconomic instability

According to Hermes and Lensink (2001:5), macroeconomic instability occurs when aggregate domestic demand exceeds aggregate domestic supply on a structural basis. Whenever a country experiences macroeconomic instability it manifests itself in a number of ways. These are a rise in the budget deficit, increases in the current account deficit, exchange rate undervaluation and high inflation rate. Macroeconomic instability leads to expectations of the government imposing higher taxes and tax-like distortions such as large exchange rate depreciation. All these effects lower returns and increase the risk and uncertainty associated with domestically held wealth. Therefore macroeconomic instability increases incentives for capital flight. Authors making the same point are Hermes and Lensink (1992), Collier, Hoeffler and Pattilo (1999).

According to the Bank of England (1989:364), macroeconomic policy shortcomings which lead to capital flight include large depreciation of exchange rates and excessive fiscal deficits (usually associated with high rates of inflation). At the structural level, interest rate ceilings and other financial market distortions which discourage local financial intermediation

provide a strong incentive to move assets abroad. Distortionary tax regulations and allocative mechanisms such as import licensing typically confer benefits on particular groups, who then seek safe havens abroad for their wealth. The long-term unsustainability of such policies increases the relative risk attached to domestic investment. Moreover, the costs of tax increases and policy reforms may fall disproportionately on holders of local assets, hence increasing the incentives for further capital flight.

2.6. Factors affecting domestic political risk

According to Tarzi (1992:444-445), a political risk factor is defined as a particular circumstance or set of circumstances which give rise to political risk outcomes or influence the occurrence of a political risk event. Macro political risk factors are systemic factors involving a political system of the society at large, whereas the micro political risk factors are those specific changes within a public policy or regulatory environment of the host government which would have a negative impact on the domestic returns if adverse circumstances occurred. Furthermore, Tarzi (1992:445-450) shows that the following macro political risk factors are often found in some countries.

2.6.1. Civil disorder

Civil disorder means a sociopolitical turmoil which leads to business and financial disruptions. It includes organized mass violence through unions, associations of students, outbursts of social violence such as riots, criminal activities such as sabotage and robbery and a general state of lawlessness or internal strife. Other forms of civil disorder include political corruption in which a host government is seen to be highly corrupt and incapable of reforming itself and intense civil discontent is reflected in civil strife. Subversion might occur from outside sources, in which foreign powers provide the military, paramilitary, ideological, logistical and political support to groups that seek to overthrow an existing regime. The result can be a prolonged period of civil strife, or even civil war.

Other forms of civil disorder are inadequate socioeconomic mobility, in which there is inability on the part of some groups and classes in a country to move out of depressing economic conditions, combined with the use of coercive methods by the government. These lead to political conflict. Oppressed groups may use violence as a political instrument for achieving goals that cannot be realized through peaceful means. Political coercion, in which there is a denial of the right to participate in the political process, and the use of force by the government to maintain the status quo, can force deprived groups to rise up against the political leadership. In addition, economic weakness, in which there are socioeconomic dislocations caused by faltering economies, can be a source of civil disorder. This can happen particularly if economic stagnation is preceded by a period of accelerated economic growth. Evidence of economic decline is seen in extremely high rates of price inflation, unemployment and declining per capita income which lead to high crime rates and other civil disorders.

2.6.2. War and territorial disputes

Often the historical demarcation of colonial boundaries of many states in Africa and their ethnic regions do not coincide. An ethnic group may spread across the border between the two states and they may live on the peripheries of each of the two states. This situation may lead to an armed struggle for the people's reunification which, in turn, poses a risk to domestic investments. Another form of war and territorial disputes includes civil wars. These events pose a risk for domestic investments.

2.6.3. A radical shift in the investment climate

The shift in the investment climate includes major restrictions imposed by host governments on foreign assets. This reduces asset returns. The extreme expression of this risk is where the assets are nationalized or the operations of the foreign firm come under the control of the host government. Nationalists and anti-free-market sentiments, which cause changes in the host government's economic ideology, especially on the role of government *vis-a-vis* foreign investment, can make the foreign ownership of key industries incompatible with a philosophy of public ownership. Often an ideological shift to the left induces such disruptions.

2.6.4. Changes in a political regime

In some countries democratic political systems are not developed enough to enable orderly transition of political power. Intense power struggles often take place whenever opportunities for change in political leadership come about. Sometimes such struggles between competing factions and parties lead to bloody wars and regime changes. In other instances the governing elites base their claim to leadership and authority on certain principles that are no longer acceptable to certain influential groups of people in the country. For instance, a monarch's rule based on hereditary principles may be challenged by modern influential groups of people who regard existing political arrangements as illegitimate. These groups in co-operation with certain elements in the military, may plan to overthrow the existing regime. The overthrow of a legitimate government by the military occurs, in part, because of a lack of institutional mechanisms for a power transfer. Coups can also be a result of competing power elites. A regime change of this sort may pose a big risk to domestic assets.

Revolutions negatively affect investment climate. Revolutions depend for their success on some of the factors which cause social upheaval and civil strife. Successful rebellion often turns into a social revolution, sweeping out the old political elite and bringing in a new set of elites with different personalities, policies and ideologies.

According to Vu Le and Zak (2001:10-11), political instability has two major components, namely regime instability and political violence. A study by Feng (1997) characterizes two different types of government change. Major regular government change is defined as a constitutional power transfer of the executive office between legitimate parties or a coalition of parties. Irregular government change occurs through unconstitutional means, for example coups, and thus may disrupt the political system. Political violence such as violent anti-government uprisings and violent government actions to suppress these uprisings also cause instability.

Some of the minor political events that can result in political risk for domestic assets will now be discussed. The discussion draws on Tarzi (1992:452-453).

2.6.5. Monetary risk

Monetary risk includes exchange losses due to the devaluation of the currency by the host government and restrictions imposed by host governments on the repatriation of funds. In the first instance, investors incur immediate financial losses as the domestic currency loses its value against a foreign currency. In the second instance, investors are deprived of using their assets for growth and earning higher financial returns elsewhere, as restrictions on the movement of capital limits investors' abilities to earn higher returns elsewhere.

2.6.6. Adverse tax changes

A shift in the philosophy of the host government can cause tax increases on foreign and domestic assets. The coming to power of a new government with a commitment to the redistribution of wealth and income will result in increased spending on social welfare programmes. One way to finance costly social welfare programmes is to increase taxes on domestic assets. If the government's projected revenues are not sufficient to cover government's developmental plans, or defence build-up, then it is most likely that taxes will be increased to cover government expenditures. These taxes will affect domestic assets.

2.6.7 Summary of section 2.1 to 2.6.6

Sections 2.1 to 2.6.6 of this thesis have shown that both economic factors and political factors play an important role in increasing investment risk. These factors are important for the thesis because adverse economic and political factors negatively affected capital flows in South Africa during the period 1960-1995. Since this thesis is going to investigate the effect of political risk on the magnitude of capital flight in South Africa, particular emphasis has been placed on political risk factors and their effects on capital flight. Section 2.7 will outline the model used in this study and discuss the causes and trends of capital flows in South Africa.

2.7. The model

A Portfolio Allocation Theory

According to Fedderke and Liu (1999:10), portfolio allocation theory states that capital flows are determined by rates of return and risk. Capital flows respond positively to higher rates of return and negatively to risk. There are two forms of risk, namely economic risk and political risk.

Capital flows = $f(\text{risk, returns})$ 2.1

Capital flows = $f(\text{economic risk, political risk, IDIFF, GDP growth rate})$2.2

Where IDIFF is the interest rate differential between foreign and domestic assets.

Equation 2.1 above outlines the theoretical model used in this study. For returns we use the exchange rate adjusted interest rate differential (IDIFF) and GDP growth rate. For risk we use measures of economic risk and political risk. Economic risk is measured in this thesis by the degree of over/undervaluation of the exchange rate. For political risk we use the quality of political and civil liberties which prevailed in South Africa during the period 1960-1995. This is measured by a political freedom index. Another important variable for political risk is the political instability which prevailed in South Africa during the period 1960-1995. This is measured by the political instability index. Thus we use equation 2.2 after substituting our variables that measure risk and return.

Model specification

Given equation 2.2 we can now provide the exact specification of our model. Based on the variables for rates of return, economic risk and political risk in South Africa, the following empirical models will be estimated in order to empirically test the hypothesis that either political instability or lack of political freedom leads to an increase in the magnitude of capital flight. Equation 2.3 below shows a regression model with a balance of payments measure of capital flight (CFBP) as a dependent variable, while equation 2.4 shows a regression model with an indirect measure of capital flight (CFIND) as a dependent variable.

$$CFBP = b_1 + b_2DIDIFF_i + b_3GROWTH_i + b_4DOVAL_i + b_5DLNFREE_i + b_6LNINST_i + b_7D80_i + b_8GOLD_i + U_i \dots\dots\dots 2.3$$

$$CFIND = b_1 + b_2DIDIFF_i + b_3GROWTH_i + b_4DOVAL_i + b_5DLNFREE_i + b_6LNINST_i + b_7D80_i + b_8GOLD_i + U_i \dots\dots\dots 2.4$$

Where CFBP is a capital flight measure based on the balance of payments method, CFIND is a capital flight measure based on the indirect method, DIDIFF is the change in the interest rate differential, GROWTH is the percentage change of real GDP (at constant 1990 prices), DOVAL is the change in the exchange rate over/undervaluation, DLNFREE is the change in the log of the political freedom index, LNINST is the log of the political instability index. As our goal is to replicate previous results in the literature, we include dummy variables for the financial liberalization of the 1980s, D80 and the gold price boom of 1981 to 1984, GOLD. The hypothesis to be tested in this thesis is that either political instability or lack of political freedom leads to an increase in the magnitude of capital flight. Table 2.1 shows the explanatory variables used in this thesis and their expected signs.

Table 2.1: Explanatory variables and their expected signs.

Description	Variable name	Expected sign
RATES OF RETURN		
An exchange rate adjusted interest differential, $i_f - (i_d - e)$. US treasury bill rate is used for the foreign interest rate i_f , while a South African treasury bill rate is used for a domestic interest rate i_d . The exchange rate e , is the end of period principal Rand/dollar rate. All the data were obtained from the IMF's International Financial Statistics (IFS) Yearbook. Since capital flows are being discussed, the first difference of the exchange rate adjusted interest differential will be used, i.e. DIDIFF.	DIDIFF	Positive
Percentage change of South Africa's real GDP (at 1990 prices). The data were obtained from the IMF's International Financial Statistics (IFS) Yearbook.	GROWTH	Negative
RISK VARIABLES		
Overvaluation or undervaluation of the exchange rate in terms of the purchasing power parity (PPP), with 1990 as a base year. $PPP = (CPI_{SA} / CPI_{US}) (R/\$)$. The data were obtained from the IMF's International Financial Statistics (IFS) Yearbook. A positive figure indicates undervaluation. Since capital flows are being discussed, the first difference is used, denoted as DOVAL.	DOVAL	Positive

Political freedom index (Source: Fedderke <i>et al.</i> , 1999). As this index <u>rises</u> political freedom <u>falls</u> . The variable is used in first differences (DLNFREE). No expected sign is postulated since political liberalization could either improve macroeconomic conditions through improved legitimacy of the ruling government or worsen macroeconomic conditions through heightened populist pressure. As part of this, note that DLNFREE can be statistically insignificant, but this means the two proposed effects cancel each other out.	DLNFREE	No expected sign
A political instability index (Source: Fedderke <i>et al.</i> , 1999). As this index <u>rises</u> political instability <u>rises</u> .	LNINST	Positive
OTHER VARIABLES		
A dummy for the financial liberalization of 1980s	D80	Positive
A dummy for the gold price boom of 1981-1984	GOLD	Negative

Source: Fedderke and Liu (1999:15).

A dependent variable

Two measures of capital flight are used in this study. They are a balance of payments measure and an indirect measure. According to Smit and Mocke (1991:114), the balance of payments measure is the sum of non-bank private short-term capital and net errors and omissions. The data for the non-bank private short-term capital and net errors and omissions were obtained from the IMF's Balance of Payments Yearbook (BOPY) by summing up codes 1994734, 1994748, 1994798 and 1994998.

According to Lensink *et al.* (1998:3), this measure reflects the idea that capital flight goes unrecorded, due to the illegal nature of these capital movements. It is argued by the proponents of this measure that the unrecorded capital movements appear in the net errors and omissions. Moreover, by concentrating on short-term flows, long-term outflows are excluded, which according to the proponents of this method, are more normal in character, meaning that this method measures "flight" capital only. This measure is sometimes referred

to as a "hot money" method of measuring capital flight.

Another dependent variable is the capital flight indirect measure. Lensink *et al.* (1998:2-3) showed that the indirect measure compares the sources of capital inflows (i.e. the sum of the increase in external debt and inflows of foreign direct investment), with the uses of these inflows (i.e. the current account deficit plus the increase in official reserves). If the sources exceed the uses of capital inflows, the difference is termed "capital flight". The increase in external debt and inflows of foreign direct investment data were obtained from the IMF's International Financial Statistics (IFS) Yearbook, lines 89b and 78bed, respectively (1989-2001 yearbooks). A current account deficit and the increase in official reserves data were obtained from the South African Reserve Bank's supplement to the quarterly bulletin, 1994. This method of measuring capital flight acknowledges the difficulties of separating "flight" capital from normal capital outflows and, therefore it measures all private capital outflows as capital flight. It takes into account both short-term and long-term capital outflows. Each of these capital flight measures will be separately regressed on the explanatory variables, so as to determine the effects of political risk measures on the magnitude of capital flight. We use this measure to be consistent with the regression analysis in the literature.

The theoretical expectation is that "flight" capital measured by the balance of payments approach is more responsive to political risk than a capital flight measured by the indirect approach. This is because "flight" capital measured by the balance of payments approach focuses on short-term "hot money" flows, which are more sensitive to political risk than the indirect approach. Our results in section 3.5 (page 67-70) show the opposite.

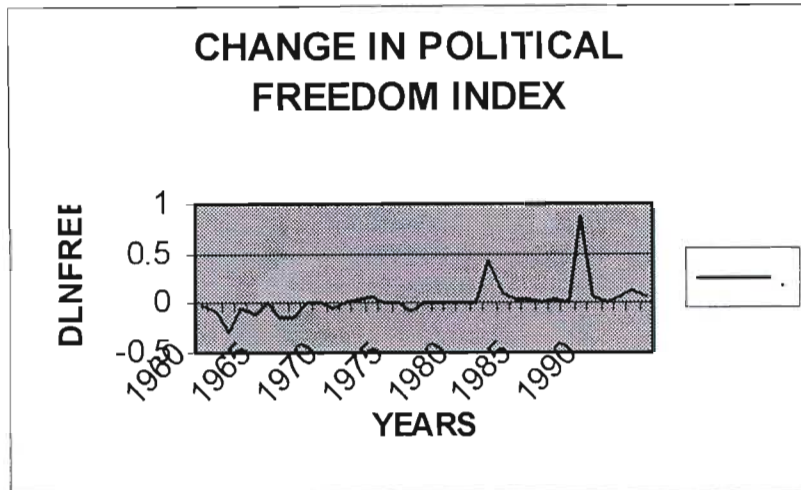
All the data for the dependent and explanatory variables are in millions of US dollars and, where the data is originally reported in rand, the end of period principle rand/dollar exchange rate is used for the conversion (Source: IMF's International Financial Statistics Yearbooks 1989-1990, 1996, 1998 and 2000). The following section, section 2.8, discusses the trends and causes of political risk and capital flows in South Africa for the period 1960-1995.

2.8. TRENDS AND CAUSES OF POLITICAL RISK AND CAPITAL FLOWS IN SOUTH AFRICA FOR THE PERIOD 1960-1995

South Africa experienced a steady decline in the quality of political and civil liberties for most of the 1960s, 1970s and 1980s due to the *apartheid* regime. According to Fedderke, de Kadt and Luiz (1999:11-12), during the period 1970 to 1980, South Africa experienced further declines in the quality of political and civil liberties. It was only in the mid-1980s, beginning with the formal, though only partial and intricately structured and circumscribed, extension of the franchise implicit in the “tricameral” legislature that situations at a formal level began to improve somewhat. Although 1986 was marked by a State of Emergency, the year also saw legislation passed that permitted the voluntary desegregation of restaurants. Influx control, a policy designed to control the movement of labour into urban areas, came to an end in 1986 and greater freedom of movement came about.

The late 1980s provide evidence of a partial and controlled extension of political rights and a formal easing of restrictions on personal liberties. This process culminated in the President F. W. de Klerk’s address to the House of Assembly on 2 February 1989, which unbanned political organizations and marked a decisive extension of the freedoms of assembly, speech and association. In 1994, South Africa’s first democratic elections took place. This extended political freedom to the majority of the people. The years that followed the 1994 elections marked the undoing of all of the *apartheid* legislation. Figure 2.1 below shows South Africa’s political freedom index for the period 1960-1995.

Figure 2.1. South Africa's political freedom index



Source: Fedderke, de Kadt and Luiz (1999).

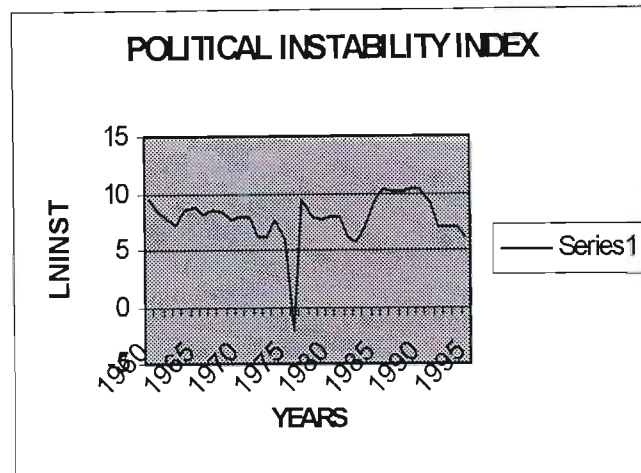
Figure 2.1 shows South Africa's political freedom index for the period 1960-1995. The index measures the quality of political and civil liberties which prevailed in South Africa during the period 1960-1995. It can be seen from the graph that the quality of political and civil liberties was very poor for the most part of the period 1960-1995. The quality of political and civil liberties started to improve a little in the mid-1980's as partial and controlled extension of political rights and a formal easing of restrictions on personal liberties took place under president F.W de Klerk's government. In 1994, political freedom was fully extended to the majority of the people as the first democratic elections took place in South Africa.

According to IDEA (2001:2), economic growth stalled in the 1970s as security and military expenditure rose sharply to cope with internal unrest, as well as with increasingly costly border protection. Heavy-handed and violent repression of demonstrations sparked widespread unrest and resistance, which escalated through the late 1970s. On 12 September 1977, Steve Biko, the Black Consciousness leader, was assaulted and died violently in police detention. This led to more unrest as violent protest demonstrations occurred throughout the country. By 1985 a massive resistance was in evidence, led by

students and activist workers. South Africa's isolation increased across a broad front of sporting, economic and cultural activities. Multinational companies started to repatriate earnings rather than reinvest and major capital flight became evident. In response, the *apartheid* government embarked on a confused route of repression and reform, coercion and liberalization. A fast-growing and increasingly militant labour movement escalated strike action. Guerrilla attacks and consumer, as well as school boycotts proliferated.

Other authors such as Fedderke, de Kadt and Luiz (1999:22-24) show political instability in the 1970s taking the form of strikes, as workers resisted *apartheid* laws and assassinations of political activists by the *apartheid* government. Political instability reached its peak in 1976, with the Soweto uprising. In order to control these sources of political instability, the *apartheid* regime introduced increasingly repressive legislation over time, a practice which continued into the next decade. This further increased political instability in South Africa. Political stability improved as the political situation changed in the run-up to the first democratic elections which were held in 1994. Figure 2.2 shows South Africa's political instability index for the period 1960-1995.

Figure 2.2. South Africa's political instability index.



Source: Fedderke, de Kadt and Luiz (1999).

Figure 2.2 shows that there was much political instability in South Africa prior to the 1994 elections with the peaks of political instability in 1976 and mid-1980s, which were periods of strong opposition activity to the *apartheid* regime. Appendix 2.1, at the end of this chapter gives a summary of events which show the extent of political freedom and political instability which prevailed in South Africa from 1960 to 1995.

During the early 1960s and early 1970s South Africa experienced net inflows of foreign financial capital. According to the IMF's report (1995:40-43), this foreign capital was used to finance either a deficit on the current account or to supplement a shortage of domestic saving, depending on which situation was dominant. During this period the foreign financial capital inflow actively enhanced growth by supplementing or augmenting either domestic savings or export earnings.

However, the situation was different in the mid-1970s to 1980s, during which there was some capital flight due to political instability. Capital continued to flow out of South Africa up to the early 1990s as political uncertainty increased just before the 1994 elections. Economic

sanctions imposed on the *apartheid* regime by the international community further reduced the amount of capital inflow to South Africa. This further affected the South African economy. According to Walt and Wet (1993:3), a major international creditor bank refused to provide further credit facilities in respect of maturing debt in 1985, setting in motion a snowballing of similar refusals by many of South Africa's other foreign creditor banks. The actions of the banks were politically motivated, as pressure by international civil rights groups increased. This pressure forced the banks to cut ties with the *apartheid* regime. South Africa was plunged into a debt crisis. The external value of the rand was certain to collapse and many domestic enterprises, including financial institutions, faced possible bankruptcy. Rather than allowing this to happen, the *apartheid* regime decided to declare a moratorium on foreign debt repayments. Concomitantly, strict exchange control measures and a dual exchange rate system were reinstated, in an attempt to limit the flight of capital from the country. Thereafter it successfully negotiated a debt repayment programme with foreign creditors. Exchange controls, reinforced by the negative effects of underlying economic problems and political uncertainty, shook the external and internal confidence in the economy of South Africa so severely that from 1985 there was a continuous outflow of foreign capital.

A study by Bond (1999) shows that from 1985 most western banks cancelled short-term credits to South Africa. The Reserve Bank and the Department of Finance asserted sovereignty over financial flows through a combination of a foreign debt payment "standstill" (followed by renegotiation every three years or so) and the introduction of a dual exchange rate-system. Once the \$13 billion in short-term debt due in 1985 had been renegotiated, the "financial rand" became the primary tool to control capital outflows. The "financial rand" was aimed not at foreign companies which wanted to repatriate either profits or capital investment, but rather at owners of financial assets. The controls substantially slowed capital flight, by serving as a form of tax on outflows. The premium ranged from 10 *percent* to 40 *percent*, depending upon exchange rates and political circumstances.

Following the abolition of the “financial rand” system in 1995, capital flowed out of the country. February 1996 witnessed huge net non-resident sales of South African bonds. The Reserve Bank’s reserves fell from nearly R16 billion to under R11 billion from year-end 1995 to mid-1996, representing a drop in import cover from two months’ worth of foreign currency for imports to less than one month’s cover. The value of the rand slid from R3.6/\$ in January 1996 to R4.4/\$ in March 1996, to R4.7/\$ in December 1996. In order to stem the outflow, interest rates were raised dramatically over a few weeks in early 1996. The three month bankers’ acceptance rate rose from 14 *percent* in March 1996 to 16.5 *percent* in May 1996 in real terms. The prime rate rose from 12 *per cent* to 15 *percent*.

Table 2.2 below shows some magnitudes of capital outflow from South Africa between 1960 and 1995, in millions of US dollars. A positive figure indicates a capital outflow while a negative figure indicates capital inflow.

Table 2.2: South Africa's capital flows 1960-1995 (millions of US dollars).

Year	Capital flight measured by the balance of payments method	Capital flight measured by the indirect method
1960	-55	635.6
1961	-17	466.8
1962	-46	388.05
1963	57	354.25
1964	69	237.15
1965	8	-201.59
1966	97	-149.05
1967	-87	-191.77
1968	-31	-808.61
1969	-47	-412.42
1970	-91	-772.54
1971	-278.83	-677.93
1972	117.26	11.85
1973	211	532.58
1974	349.96	-955.03
1975	133.56	-1009.45
1976	229.75	226.95
1977	938.67	2346.1
1978	805.04	2550.45
1979	1280.37	4665.27
1980	1836.42	3508.5
1981	-1160.33	-2471.06
1982	-141.31	-2247.3
1983	8.55	602.09
1984	1159	649.68
1985	3342	4865.74
1986	1318	5124.43
1987	407	3748.52
1988	2427	3022.52
1989	1704	1612.97
1990	410	2430.09
1991	1355	2238.62
1992	1257	1712.78
1993	2870	4150.27
1994	799	991.02
1995	311	-3376.94

Sources: IMF Balance of Payments Statistics Yearbooks 1970-2000.

IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

SARB Supplement to Quarterly Bulletin 1994.

In Table 2.2 it is seen that South Africa experienced a mixture of capital inflows and capital outflows from 1960 to 1970. Capital flowed into South Africa during 1970 and 1971, but thereafter the country experienced capital outflows. Both measures of capital flight suggest capital inflows in 1970 and 1971. These inflows might be attributed to the strong performance of the South African economy, starting in the 1960s and continuing to the early 1970s. Both measures of capital flight show substantial outflows during the years 1976-1980 and 1985-1994, mainly due to adverse political factors and political uncertainty which surrounded the 1994 elections. Capital inflows in 1981 and 1982 were attributed chiefly to the gold price boom which attracted foreign capital to South Africa.

Adverse domestic political factors were a primary cause of capital flight from South Africa. The data in Table 2.2 substantiate this view, namely that the bulk of the capital outflows were concentrated in the periods following major domestic political upheavals in 1976 and 1985 to 1990 and the political uncertainty in 1993 just before the 1994 elections. Despite the differences in magnitude of capital flight from South Africa shown by the two measures, they both indicate that South Africa experienced capital outflows during the 1970s and 1980s.

International confidence improved following the peaceful transition to majority rule in May 1994, marking the end of international financial and economic sanctions. However, the political transformation and the presence of a democratically elected government have not yet removed all the uncertainties and risk factors perceived as important by foreign investors in making investment decisions. These factors are a high crime rate, uncertainty over a land redistribution programme, corruption and foreign policy towards Zimbabwe. This partly explains why capital flight continued to take place up to the time of writing.

Domestic and foreign returns

A returns differential between South African and foreign assets played an important role in influencing capital movements in South Africa as capital flows responded positively to higher returns and negatively to lower returns. Table 2.3 shows the trends of South Africa's and the US treasury bill rates from 1960 to 1995. South Africa's treasury bill rate is used as a proxy for the domestic rate of return, while the US treasury bill rate is used to indicate foreign returns. Table 2.3 also shows the trends of capital movements in South Africa for the period 1960-1995.

It can be seen from Table 2.3 that returns on South African assets were higher than the US returns in 1960, 1961, 1967 and 1971. This period coincided with the inflow of short-term capital to South Africa (capital flight measured by the balance of payments approach). Capital flow, measured by an indirect method, flowed into South Africa in 1967, 1971 and 1975. This was a period in which returns on South African assets were higher than the US returns. Returns on South African assets were also higher from 1983 to 1995, but both measures of capital flow show that capital flowed out of the country due to the high political instability which prevailed in South Africa during that period. The higher returns on American assets which prevailed in 1963 and 1964 led to the outflow of capital from South Africa in response to higher returns abroad.

Table 2.3 US and South Africa treasury bill rates with capital flow trends 1960-1995.

Year	US treasury bill rate (percent per annum)	SA treasury bill rate (percent per annum)	Capital flight measured by the balance of payments method (millions of US dollars)	Capital flight measured by the indirect method (millions of US dollars)
1960	2.94	3.6	-55	635.6
1961	2.38	4.25	-17	466.8
1962	2.78	2.78	-46	388.05
1963	3.16	1.99	57	354.25
1964	3.55	2.9	69	237.15
1965	3.95	4.04	8	-201.59
1966	4.88	4.2	97	-149.05
1967	4.33	4.87	-87	-191.77
1968	5.35	4.9	-31	-808.61
1969	6.69	4.61	-47	-412.42
1970	6.44	4.39	-91	-772.54
1971	4.34	5.38	-278.83	-677.93
1972	4.07	5.3	117.26	11.85
1973	7.03	3.18	211	532.58
1974	7.87	5.43	349.96	-955.03
1975	5.82	6.12	133.56	-1009.45
1976	4.99	7.44	229.75	226.95
1977	5.27	7.87	938.67	2346.1
1978	7.22	7.81	805.04	2550.45
1979	10.04	5.26	1280.37	4665.27
1980	11.62	4.65	1836.42	3508.5
1981	14.08	9.8	-1160.33	-2471.06
1982	10.72	15.59	-141.31	-2247.3
1983	8.62	13.45	8.55	602.09
1984	9.57	19.33	1159	649.68
1985	7.49	17.56	3342	4865.74
1986	5.97	10.43	1318	5124.43
1987	5.83	8.71	407	3748.52
1988	6.67	12.03	2427	3022.52
1989	8.11	16.84	1704	1612.97
1990	7.51	17.8	410	2430.09
1991	5.41	16.68	1355	2238.62
1992	3.46	13.77	1257	1712.78
1993	3.02	11.31	2870	4150.27
1994	4.27	10.93	799	991.02
1995	5.51	13.53	311	-3376.94

Source: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

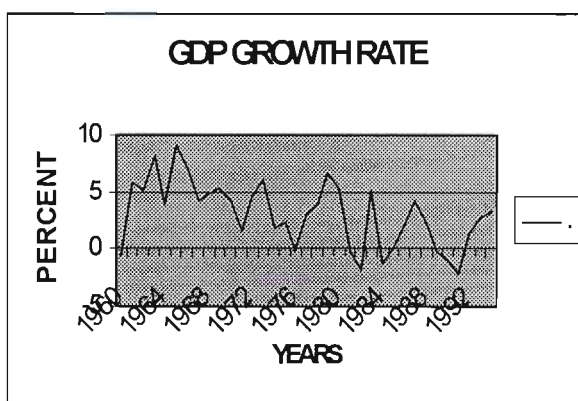
IMF Balance of Payments Yearbooks 1970-2000.

SARB Supplement to Quarterly Bulletin 1994.

GDP growth rate

Other variables which influenced capital flows in South Africa were the GDP growth rate and the exchange rate over/undervaluation. Investors use GDP growth rate as a proxy for returns on domestic assets. A higher GDP growth rate relative to the rest of the world indicates that returns on domestic assets are higher than returns on the foreign assets for an equivalent amount of risk. This leads to capital flows into the domestic economy. Figure 2.3 shows South Africa's GDP growth rate for the period 1960-1995.

Figure 2.3. South Africa's GDP growth rate 1960-1995.



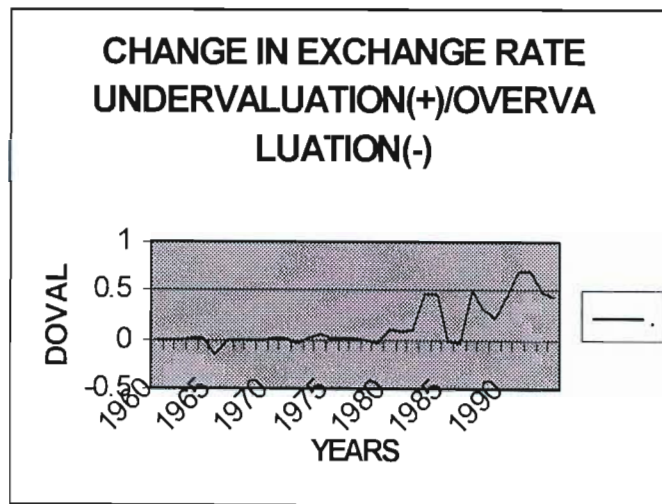
Source: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

It can be seen from Figure 2.3 above that South Africa experienced a high GDP growth rate from the mid-1960s to early 1970s. For most of the mid-1980s and 1990s, however, South Africa experienced a low GDP growth rate and sometimes a negative growth rate. Both measures of capital flight show that capital flowed into South Africa from the mid-1960s to early 1970s indicating that a high GDP growth rate played a part in attracting capital flows into South Africa.

Exchange rate under/overvaluation

Macroeconomic instability in the form of exchange rate overvaluation leads to expectations of the government imposing higher taxes and paradoxically tax-like distortions such as a large exchange rate depreciation. All these effects lower returns and increase the risk and uncertainty associated with domestically held wealth. Therefore, exchange rate overvaluation increases the incentives for capital flight. Capital flight, which dominated much of the mid-1970s, 1980s and early-1990s, led to the undervaluation of the South African currency as the outflow of capital created a shortage of dollars in the South African economy. This caused the rand to depreciate below its equilibrium level. Figure 2.4 shows a change in South Africa's exchange rate under/overvaluation for the period 1960-1995.

Figure 2.4 Change in South Africa's exchange rate under/overvaluation, 1960-1995. A positive figure indicates an undervaluation of the exchange rate.



Source: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

From Figure 2.4 above, it can be seen that South Africa experienced exchange rate overvaluation in the late 1960s and early 1970s but experienced exchange rate undervaluation for most of the mid-1970s and the rest of 1980s and 1990s. This was caused

mainly by capital flowing out of South Africa for much of this period. This put downward pressure on the South African currency.

2.9 Conclusion

Capital flight is a function of economic and political risk, foreign rates of return and domestic rates of return. This thesis investigates whether political risk increases the magnitude of capital flight. The literature reviewed has placed a particular emphasis on political risk factors and their effects on capital flight. It is obvious from the literature review that political risk, or the expectation of political risk, increases the magnitude of capital flight because political risk reduces the returns on domestic assets, hence creating an incentive for capital flight. The literature review shows that the adverse political developments which took place in South Africa played an important role in bringing about capital flight. Chapter 3 deals with the empirical analysis based on the economic model outlined in this chapter.

Appendix 2.1: A summary of events that shows the extent of political freedom and political instability which prevailed in South Africa from 1960 to 1995.

Year	Events
1960	<p>Publication and Entertainments Bill</p> <p><u>Proclamation No.58, Government Gazette No.6383</u>: control of the exhibition of films in African areas.</p> <p><u>Unlawful Organisations Act No.34</u>: enabling legislation to allow for the banning of African National Congress and Pan Africanist Congress.</p> <p>Increased penalties for certain offences under the Riotous Assemblies Act of 1956.</p> <p><u>Regulations 19 and 20 of the Regulations for the Administration of the Transkeian Territories</u>: authorized indefinite detention without trial.</p> <p>Sharpeville</p> <p>State of emergency under section 2 of Public Safety Act No.3 of 1953, with far-reaching discretionary executive powers, and limitations of freedom of assembly, speech, and association.</p>
1961	<p><u>General Law Amendment Act No.39</u>: extends limitations on freedoms of association and assembly contained in Riotous Assemblies Act of 1956.</p>
1962	<p><u>General Laws Amendment Act No.66</u>: creation of new capital offence of sabotage; first capital offence with burden of proof on accused.</p> <p>Further limitations on freedom of movement and association.</p>

1963	<p><u>General Laws Amendment Act No.37</u>: substantial further curtailment of civil liberties, including the content of unlawful political activity/orientation; conflation of government with state, and exemption from liability of government offices with respect to matters pertaining to public safety. Wider discretionary powers to declare persons or organizations unlawful; courts bound to accept validity of such proclamations - erosion of the independence of judiciary. Detention without trial introduced.</p> <p><u>Bantu Law Amendment Act No.37</u>: further limitation on freedom of movement and association of "Natives", as well as other racial groups.</p> <p><u>Aliens Control Act No.30</u>: restricts rights of appeal of aliens to executive action (under Admission of Persons to the Union Act of 1913).</p> <p><u>Publications and Entertainment Act No.26</u>: introduction of broad internal censorship. Creates Publications Control Board to implement censorship.</p>
1964	<p><u>General Laws Amendment Act No.80</u>: extends power to coerce "recalcitrant witnesses." Extension of compulsory corporal punishment.</p> <p><u>Bantu Laws Amendmend Act No.42</u>: further limitation on freedom of movement and residence of natives.</p>

1965	<p><u>Suppression of Communism Amendment Act No.97</u>: extensions of discretionary and unaccountable executive power (the “silencing clause”); further censorship and wide-ranging banning powers.</p> <p><u>Railway and Harbours Control and Management Consolidation Act No.6</u>: broad powers to control access to South African harbours.</p> <p><u>Official Secrets Act No.65</u>: extended secrecy to any police or military matter.</p> <p>Criminal Procedure Amendment Act No.96: extension of powers of detention without trial.</p>
1966	-
1967	<p><u>Terrorism Act No.80</u>: extension of powers of detention without trial, of interrogation; death penalty for terrorism and minimum prison sentence (5 years) introduced.</p> <p><u>Suppression of Communism Amendment Act No.24</u>: extends powers of banishment; power may be exercised without prior notice to any person.</p>
1968	<p><u>Prohibition of Mixed Marriages Amendment Act No.21</u>: extends prohibitions of the act of 1949 to marriages concluded outside the Republic of South African citizens or domiciles.</p> <p><u>Separate Representation of Voters Act No.56</u>: abolition of non-whites representation in Cape Provincial Council.</p> <p><u>Prohibition of Political Interference Act No.51</u>: further limitation of freedom of association and assembly.</p> <p><u>South African Indian Council Act No.31</u>: creates Indian representative council.</p>

1969	<p><u>Prohibition of Disguises Act No.16</u>: absurd limitation of civil liberty. Burden of proof placed on “accused”.</p> <p><u>Immorality Amendment Act No.57</u>: limitation of civil liberties of homosexual persons.</p> <p><u>Community Development Amendment Act No.58</u>: extension of discretionary power of Community Development Boards.</p> <p><u>Group Areas Amendment Act No.69</u>: extension of executive powers in implementation of Group Areas Provisions.</p> <p><u>Publication and Entertainment Amendment Act No.85</u>: extension of censorship powers.</p>
1970	-
1971	<p><u>Extension of University Education Amendment Act No.29</u>: negative influence on academic freedom.</p> <p><u>Newspaper and Imprint Registration Act No.63</u>: restriction of freedom of information.</p>
1972	-
1973	<p><u>Gatherings and Demonstrations Act No.52</u>: restriction of freedom of association and assembly.</p> <p><u>Aliens Control Act No.40</u>: Indians exempted from need to obtain permission to travel between provinces.</p> <p>The Durban strikes</p> <p>NUSAS Bannings-Schlebusch Commission Report.</p>
1974	<p>Slight decline in prosecution under the pass laws.</p> <p><u>Publications Act No.42</u>: restriction of judicial powers with regard to censorship.</p>
1975	Andre Brink’s “Kennis van die Aand” banned; upheld on appeal

1976	<p>Soweto uprising.</p> <p><u>Parliamentary Report No.78</u>: reduction in scope of corporal punishment</p> <p><u>Coloured Representative Council Amendment Act No.94</u>: grants coloureds in the Transkei representation on the Coloured Representative Council.</p>
1977	<p><u>Indemnity Act No.13</u>: indemnifies state and its executive officers for acts committed during 1976 uprising.</p> <p>Death in detention of Steve Biko.</p> <p>Repression after 19 October 1977 (Many detentions of political activists).</p>
1978	<p>Assassination of Richard Turner.</p>
1979	<p>Riekert Commission Report.</p>
1980	<p><u>Fifth Amendment Act No.101</u>: Compromises representation by virtue of introduction of nominated members of a parliament.</p> <p><u>National Key Points Act No.102</u>: extends capacity for strategic control.</p>
1981	<p><u>The Republic of South Africa Constitution Amendment Act No.40</u>: term of office of nominated members of a parliament extended for 180 days after an election.</p>

1982	<p><u>Internal Security Act No.74</u>: consolidation of existing security legislation; marginal improvement in civil liberties through limitation of ministerial powers.</p> <p><u>Protection of Information Act No.84</u>: consolidation of Official Secrets Acts.</p> <p><u>Intimidation Act No.72</u>: slight further limitation of freedom of association and assembly.</p> <p><u>Demonstration in or near Court Buildings Act No.71</u>: further limitation of freedom of association and assembly.</p> <p>Early 1980s focused on consolidation and rationalization of previous legislation.</p> <p>Further treason trials.</p>
1983	<p><u>South Africa Constitution Act No.110</u>: move away from Westminster system; extension on racial grounds of a franchise to coloureds and Indians in South African parliament (Tricameral System); extension of State President's powers.</p>
1984	<p>Tricameral Constitution in place</p>
1985	<p><u>Repeal of Prohibition of Mixed Marriages Act No.72</u>. Repeal of the Prohibition of Mixed Marriages Act of 1949 and Section 16 of the Immorality Act of 1957.</p> <p>Group Areas Act still in force.</p> <p>State of Emergency was declared due to rising <i>anti-apartheid</i> resistance.</p>

1986	<p><u>Identification Act No.72</u>: deracializes the classification of citizens.</p> <p>Abolition of Influx Control Act No.68: lifting restrictions on freedom of movement</p> <p><u>Restoration of Citizenship Act No.73</u>: restoring South African citizenship of citizens of TBVC states permanently resident in the Republic.</p> <p>Many areas exempted from provisions of Group Areas Act by proclamation.</p> <p>State of Emergency continued and extended.</p> <p>Voluntary desegregation of restaurants .</p> <p>White Paper on Urbanization.</p>
1987	-
1988	<p>Renewal of the State of Emergency.</p> <p>Number of free trade areas proclaimed under the Group Areas Act.</p>
1989	<p>Renewal of the State of Emergency.</p> <p>September elections.</p>
1990	<p>De Clerk's February 2 address to parliament.</p> <p>Unbanning of ANC, SACP, Communist Party; restrictions on 37 organizations lifted.</p> <p>Many proclamations and emergency regulations withdrawn by the President.</p> <p><u>Indemnity Act No.35</u>: conditional or unconditional indemnity to persons previously affected by security legislation.</p> <p><u>Criminal Law Amendment Act No.107</u>: reduction in scope of capital punishment.</p> <p><u>Public Amenities Repeal Act No.100</u>: racial desegregation of public areas.</p>

1991	<p>Abolition of Racially Based Land Measures No.108: repeal Black Land Acts of 1913 and related Acts.</p> <p><u>Extension of Indemnity Act of 1990 R.40</u>: extends indemnity for further year.</p> <p>Internal Security and Intimidation Act No.138: involves normalization of public law in line with political and constitutional developments.</p> <p><u>South Africa Citizenship Amendment Act No.70</u>: restored citizenship to those who had it removed/stripped in previous legislation.</p> <p><u>Population Registration Repeal Act No.114</u>: terminated the practice of racial classification; maintained classification in existing register.</p> <p><u>Universities Amendment Act No.123</u>: repealed provisions of Universities Act 61 of 1955. Positive for academic freedom and university autonomy.</p> <p><u>Child Care Act S52A</u>: prohibition of employment of minors under 15.</p>
1992	<p>CODESA</p> <p><u>Constitution Amendment Act No.146</u>: enabled parliament to assign constitution amending powers to some other body. Positive for political participation and representation.</p> <p><u>Constitution Amendment Act No.147</u>: allowed State President to appoint anyone to Cabinet regardless of race or status.</p> <p><u>Referendum Amendment Act No.97</u>: incorporating all or any portion of South African citizenry in the definition of a voter.</p>

1993	<p>Interim Constitution</p> <p><u>Constitution of the Republic of South Africa, 1993, Act No.200:</u> Introduction of supervening bill of rights; right to equality before and protection of the law; wide anti discriminatory provisions, suffrage extended to all citizens over 18 years of age; constitution declared supreme law of the land; parliamentary sovereignty swept aside. Creation of Constitutional Court; Juridical Services Commission to provide for independent judiciary; Public Services Commission; Financial and Fiscal Commission; Public Protector; Auditor General: Human Rights Commission; Commission on Gender Equality. Strong protection of liberties, autonomy of different institutional spheres within both state and civil society.</p>
1994	<p>Interim Constitution.</p> <p><u>Human Rights Commission Act No.54:</u> Independent human rights commission created.</p> <p>First fully democratic elections.</p> <p>First appointments to Constitutional Court.</p>
1995	<p>Interim Constitution.</p> <p>Constitutional Court abolishes death penalty.</p> <p><u>Promotion of nation unity and reconciliation Act No.34:</u> enables Truth and Reconciliation Commission.</p> <p><u>Auditor General Act No.12:</u> extends the role of Auditor General.</p>

1996	<p><u>Constitution of South Africa Act No.108</u>: required ratification by Constitutional Court; public protector given investigative power (positive for civil liberties); Human Rights Commission given watchdog powers; commission established for the protection of cultural and linguistic communities.</p> <p>Constitutional Court establishes its independence by refusing to ratify original text of Constitution until satisfactorily amended.</p> <p><u>Commission on Gender Equality Act No.39</u>: positive for gender non discrimination.</p>
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Source: Fedderke, de Kadt and Luiz (1999).

CHAPTER 3

EMPIRICAL ANALYSIS: RESULTS AND DISCUSSION

3.1 Introduction

The empirical analysis is based on the economic model outlined in chapter 2. Chapter 3 will deal with an empirical analysis of the data collected by the researcher and a discussion of the empirical results. Section 3.2 discusses the concepts of stationarity, unit roots and cointegration. Section 3.3 gives the stationarity test results. Section 3.4 presents cointegration test results. Section 3.5 provides the estimated equations and discusses the parameter estimates obtained. Section 3.6 compares Fedderke and Liu's results with the results obtained in this study. To further improve the quality and reliability of the present estimates, a robust estimation based on a least absolute errors (LAE) technique is conducted in section 3.6. Section 3.7 discusses the implication of the present author's results for the current exchange rate situation in South Africa. Section 3.8 gives a summary of the chapter's results.

3.2. Data

Regression analysis based on time series data implicitly assumes that the underlying time series are stationary. Gujarati (1995:713) shows that a time series is stationary if its mean and variance are constant over time and the covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. The classical t tests, F tests and others, are based on this assumption.

In practice, some economic time series are non-stationary and when regressions are run on these non-stationary data, spurious results are obtained. Spurious regressions are obtained in situations where the variables appear to be meaningfully related but, on closer inspection, the relationship between the variables actually turns out to be spurious because of the presence of a common trend running through the data and not because of a true relationship between the variables. The method of cointegration makes it possible to estimate the true relationship between the variables.

In addition, Gujarati (1995:709) explains that in regressing a non-stationary time series on another non-stationary time series, one often obtains a very high coefficient of correlation (R^2) even though there is no meaningful relationship between the variables. This leads to a spurious regression. In spurious regressions, a high R^2 observed is due to the presence of a strong trend between the variables and not to a true relationship between the variables, rendering the usual tests invalid.

Since the present study makes use of time series data, it is important to find out if the relationship between economic variables is true or spurious. The data used in this study were obtained from several sources, namely IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998 and 2001, IMF Balance of Payments Statistics Yearbooks, 1970 to 2000, and a supplement to the South African Reserve Bank Quarterly Bulletin, June 1994.

The following section reviews the concepts of stationarity, unit roots and cointegration as they form the basis of the empirical work used later in the study.

3.2.1. Stationarity and unit roots

According to Gujarati (1995:712), any time series can be thought of as generated by a stochastic or random process. When this stochastic process exhibits a constant mean, variance and auto-covariance over time (i.e. they are time invariant), it is said to be stationary. Gujarati (1995:713) further explains that a time series is stationary if its mean and variance are constant over time and the covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. This principle was also studied by Granger (1986) and Engle and Granger (1987).

Furthermore, McDermott (1990:2) points out that a stationary time series is the one in which the underlying stochastic process that generates the time series is time invariant, meaning that plotting the time series data for a variable from two separate but equal length time periods would give two plots with similar statistical properties. This is because the series keeps returning to its mean level and so the series is stationary about its mean. Any sudden changes experienced in one period do not continue to affect the data series in future time periods because of this characteristic of constantly varying around, and returning to, the same mean value.

The following first order autoregressive process illustrates the definition of a constant mean and variance of a stationary time series by using a simple data generating process for the time series Y_t where Y_t is generated by the regression of Y_t on itself lagged by one period.

$$Y_t = \rho Y_{t-1} + U_t \dots\dots\dots 3.1$$

where ρ is the coefficient of autocovariance;

Y_{t-1} is time series Y_t lagged by one period;

U_t is the stochastic error term with zero mean, a constant variance and no autocorrelation.

It can be seen from equation 3.1 that the value of a time series in one period depends on its value in the previous period and on a stochastic error term. The coefficient of autocovariance determines by how much the current value of Y_t depends on its previous value. When the absolute value of ρ is less than 1, then the current value of Y_t is influenced by only a fraction of its previous value and when ρ is zero Y_t becomes equal to U_t , so that each observation, Y_t is not influenced by any previous value of itself. The time series returns to its previous values with a constant mean and variance and is thus stationary. So if the value of ρ is zero, then the time series is stationary.

However, a non-stationary time series has different characteristics. According to studies carried out by Granger (1986), and Engle and Granger (1987), the non-stationary time series is considered to have the following characteristics:

- An infinite variance as time tends to infinity.
- Changes occurring in one period do affect the time series in all subsequent periods.
- An infinite expected time length between the crossings of the mean.
- Autocorrelation coefficient close to one.

From equation 3.1 above, time series Y_t may be non-stationary if ρ is equal to one, as the full influence of every past value of Y_t affects the current value of Y_t . Consequently, any changes that occur in one period are carried through into all subsequent periods.

According to Harris (1995:15), this means that the full impact of the random growth of every past value of the time series Y_t influences the current value, so that the variance of Y_t will become infinitely large as t tends to infinity. The error term of the time series will be perfectly correlated with itself over time, indicating the presence of autocorrelation. The time series Y_t will then have different means at different points in time, rather than one mean value in the conventional sense, as the time lapses between the series returning to one of its original values is infinite.

However, the error term associated with the time series Y_t is not correlated with itself when the time series is stationary (i.e. when the absolute value of ρ is less than 1), because the current value of Y_t is influenced by only a fraction or none of its past value, so that the error term associated with the current value of Y_t is then only influenced by a fraction of the value of the error term in previous periods. The most recent error term will be weighted more heavily than preceding error terms in stationary time series, so that correlation of the error term with itself over time is finite and decreasing. As Gujarati (1995:709) shows, running regressions on non-stationary time series using ordinary least squares (OLS) estimation results in a spurious regression. In spurious regressions a high observed R^2 is due to the presence of a strong trend between the dependent variable and the explanatory variable, not as a result of a true relationship between the dependent and explanatory variables, thus rendering the classical tests invalid and producing misleading and incorrect regression results (See studies by Banerjee *et al.*, 1986, Granger and Newbold 1986).

According to Malley (1989:52), a non-stationary error structure is said to be associated with a relationship estimated using trended variables, because the variables are influenced by a trend component which, when not taken into account by including it in the regression as a variable, is then captured by the error term of the regression and the error term will then become non-stationary. The error terms then become correlated with one another in a regression run on non-stationary data, with the result that the regression suffers from autocorrelation.

Granger and Newbold (1974:111) show that the consequences of this non-stationary error structure include the following:

- An inefficient parameter estimate, i.e. large variances of the regression coefficients.
- Inferior forecasts due to spurious regression.
- Unreliable t and F tests.

Studies by Phillips (1986), Granger and Newbold (1974) and Harris (1995), indicate that in the presence of this non-stationarity, the t-distribution tends to diverge from the normal distribution. This causes the use of conventional critical values of the standard t-distribution to be invalid. As the sample size increases, the non-stationary series exhibits an increasing variance, which means that the confidence intervals tend to be much wider leading to the acceptance of the null hypothesis more readily. The t-ratios of one or more coefficients also tend to be statistically insignificant due to the large variances of the regression coefficients.

According to Gujarati (1995:718), in time series econometrics, a time series that has a unit root is known as a random walk. And a random walk is an example of a non-stationary time series. Stock and Watson (1988:151) point out that because of the random growth of random walks, forecasts of the levels of non-stationary data will increase in uncertainty as the time frame over which the forecasts are being made lengthens, because this random growth in the stochastic trend of the variable in one period forms the base from which the next period's growth results.

In order to counter the problems which arise from running regressions on non-stationary data, the solution could be to make the relevant time series data stationary by differencing it, then running the regressions. Differencing involves subtracting the value of the variable lagged by one period from its current value, and if necessary, repeating the process by subtracting lagged values from the new values until Y_t equals U_t . Below we present the autoregressive equation based on equation 3.1.

$$Y_t = \rho Y_{t-1} + U_t \dots\dots\dots 3.2$$

If ρ is 1, then the time series has a unit root and is non-stationary. When ρ is zero, the time series Y_t becomes equal to the error term, U_t . The time series Y_t is thus stationary.

A non-stationary time series (i.e. with a unit root, $\rho = 1$), can be made stationary by taking the first difference of the non-stationary time series, Y_t , as follows:

$$Y_t - Y_{t-1} = (\rho - 1) Y_{t-1} + U_t$$

$$\Delta Y_t = (\rho - 1) Y_{t-1} + U_t \dots\dots\dots 3.3$$

where $\Delta Y_t = Y_t - Y_{t-1}$

If $\rho = 1$, then equation 3.3 becomes,

$$Y_t - Y_{t-1} = U_t$$

$$\Delta Y_t = U_t \dots\dots\dots 3.4$$

From equation 3.4, it can be seen that the first difference of the non-stationary time series has been made stationary through differencing if $\rho = 1$. The previous non-stationary time series has become stationary and contains no unit root. Gujarati (1995:719) explains that if a time series is differenced once, and the differenced series is stationary, it is said that the original (random walk) series is integrated of order 1, denoted by $I(1)$. Similarly, if the original series has to be differenced twice before it becomes stationary, the original series is integrated of order 2, or $I(2)$. In general, if a time series has to be differenced d times, it is integrated of order d , or $I(d)$. Thus, any time there is an integrated time series of order 1 or greater, a non-stationary time series results. By convention, if $d = 0$, the resulting $I(0)$ process represents a stationary time series (as it needs to be differenced zero times to become stationary). (See also Dolado, Jenkinson and Sosvilla-Rivero 1990). In order to test the series for stationarity, a Dickey-Fuller test is used. The Dickey-Fuller test is used where the null hypothesis is that a time series contains a unit root, i.e. the series is non-stationary.

Beginning with equation 3.3, if we regard $(\rho - 1)$ as δ we obtain equation 3.5.

$$\Delta Y_t = \delta Y_{t-1} + U_t \dots\dots\dots 3.5$$

where $\delta = \rho - 1$, and Δ is the first difference operator. It can be seen that equation 3.3 and equation 3.5 are the same. The null hypothesis is that $H_0: \delta = 0$, i.e. the series is non-stationary (Gujarati 1995:718).

The test of significance used is the tau test, and not the conventional t test, as the t test is now invalid because the data no longer follow the standard t-distribution in the presence of non-stationarity. The distribution, which is followed is known as the Dickey-Fuller distribution, and the calculated statistic is called the Dickey-Fuller tau statistic. The critical values used to test the tau statistic were computed by Dickey and Fuller (1979:430) and are given in Appendix A of this thesis.

If the absolute value of the computed t statistic exceeds the absolute value of the critical Dickey-Fuller tau statistic from tables, the hypothesis that the time series is non-stationary is rejected. If, however, the computed absolute value of the t statistic is lower than the absolute value of the critical Dickey-Fuller tau statistic, then the hypothesis that the time series is non-stationary is accepted.

For theoretical and practical reasons, Gujarati (1995:720) explains that the Dickey-Fuller test is applied to regressions run in the following forms.

$$\Delta Y_t = \delta Y_{t-1} + U_t \dots\dots\dots 3.6$$

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + U_t \dots\dots\dots 3.7$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + U_t \dots\dots\dots 3.8$$

where t is the time or trend variable. In each case the null hypothesis is that $H_0: \delta = 0$, that is there is a unit root. The difference between equation 6 and the other two regressions lies in the inclusion of the constant term and the trend term.

If the error term U_t is autocorrelated, equation 3.8 is modified into the following equation:

$$\Delta Y_t = \beta_1 + \beta_2 + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + U_t \dots\dots\dots 3.9$$

where, for example, $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = Y_{t-2} - Y_{t-3}$ etc. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term in equation 3.9 is serially independent. The null hypothesis is still $H_0: \delta = 0$, that is a unit root exists. When the Dickey-Fuller test is applied to models like equation 3.9, it is called the Augmented Dickey-Fuller (ADF) test. The ADF test statistic has the same asymptotic distribution as the Dickey-Fuller statistic, so the same critical values can be used.

If the absolute value of the computed t statistic exceeds the absolute value of the critical Augmented Dickey-Fuller tau statistic from tables, the hypothesis that the time series is non-stationary is rejected. If, however, the computed absolute value of the t statistic is less than the absolute value of the critical Augmented Dickey-Fuller tau statistic, the hypothesis that the time series is non-stationary is accepted.

It has thus far been shown that by differencing the data and applying relevant unit root tests it is possible to make non-stationary time series data stationary for the purpose of avoiding spurious regressions. However, Hendry (1986:204) shows that once the problem of non-stationarity is solved by differencing, another problem arises, as differencing often causes a loss of long-run information, which is given by the levels, but not by the differences, of the variables. Moreover, many economic theories are usually expressed as a long-term relationship between variables in their level forms and not in their difference forms, so that

running a regression on differenced data will be theoretically inconsistent. One way to avoid this loss of information from differencing time series is to use the cointegration technique, which was developed by Granger and his fellow econometricians (See Granger and Weiss 1983, Granger 1986, Engle and Granger 1987).

3.2.2 Cointegration

According to Engle and Granger (1987:251-255), the cointegration technique addresses the spurious regression problem by regressing non-stationary time series on each other, provided that these non-stationary variables are integrated of the same order, or cointegrated. This is because, when variables are integrated of the same order, they contain the same trends and so regressing the variables on each other will cause these trends to cancel out, leaving behind only the true relationship between the variables and the long-run relationship between the cointegrated variables becomes possible.

According to Gujarati (1995:730), cointegration means that despite being individually non-stationary, a linear combination of two or more time series can be stationary. Cointegration of two or more time series suggests that there is a long-run meaningful relationship between the time series. The following simple regression equation is used to explain the concept of cointegration more fully.

$$Y_t = \beta_1 + \beta_2 X_t + U_t \dots\dots\dots 3.10$$

A linear combination of variables Y and X is represented by the error term, U_t . This error term can be written in the following form:

$$U_t = Y_t - \beta_1 - \beta_2 X_t \dots\dots\dots 3.11$$

It is clear from equation 11 that the error term U_t is just a linear combination of Y and X. However, both Y and X have unit roots. The test for cointegration involves testing for

stationarity of the error term, U_t . If U_t is found to be stationary, then the variables Y and X are said to be cointegrated. "If Y and X have unit roots, but some linear combination of them is stationary, then we can say that Y and X are cointegrated" (Koop 2000:153).

According to Gujarati (1995:726), intuitively it is seen that when U_t is stationary the trends in Y and X cancel out. Thus, if a series Y is $I(1)$ and another series X is also $I(1)$, they can be cointegrated. In general, if Y is $I(d)$ and X is also $I(d)$, where d is the same value, these two series are said to be cointegrated. If that is the case, the regression on the levels of Y and X is meaningful (i.e. not spurious) and no valuable long-term information is lost, which would result if their first differences were used instead. In short, provided it is checked that the error term from regressions like equation 10 above is stationary, the OLS estimation, including t and F tests, are applicable to data involving time series.

As mentioned above, if Y and X are cointegrated, then the spurious regression problem does not apply. Consequently, an ordinary least squares (OLS) regression of Y on X can be run and valid results obtained. Koop (2000:153-154), stressed that before using results from this cointegrating regression, it is important to verify that Y and X are, in fact, cointegrated. Many tests for cointegration exist but the test for cointegration described in this thesis is called the Engle-Granger test, named after the two econometricians who developed it. Given the close relationship between the error terms and residuals, it is reasonable to examine the properties of the residuals in order to investigate the presence of cointegration.

According to Gujarati (1995:725-728), the Engle-Granger (EG) and Augmented Engle Granger (AEG) tests are based on Dickey-Fuller and Augmented Dickey-Fuller tests. The EG and AEG tests are carried out by running the regression of Y on X and then testing the regression residuals for the presence of unit roots. This is done by differencing the residuals and regressing differenced residuals on their lagged values without the inclusion of an intercept term. The null hypothesis is that of no cointegration. The test regression is given as follows:

$$\Delta u_t = \phi u_{t-1} + \varepsilon_t \dots\dots\dots 3.12$$

where Δu_t is the first difference of the residual from cointegrating regression

u_{t-1} is u_t lagged by one period

ε_t is the stochastic error term

We apply the Dickey-Fuller (DF) or the Augmented Dickey-Fuller (ADF) tests to determine stationarity of the residuals. However, Gujarati (1995:727) notes that there is one precaution to exercise. Since the estimated residual is based on the estimated cointegrating regression, the DF and ADF critical significance values are not quite appropriate. Engle and Granger have calculated the appropriate values which can be found in Appendix B of this thesis. Therefore, the DF and ADF tests in the present context are known as the Engle-Granger (EG) test and the Augmented Engle-Granger (AEG) test.

If the computed absolute value of the t statistic exceeds the absolute value of the critical Engle-Granger tau statistic, the hypothesis that the estimated residual is non-stationary is rejected, meaning that the individual time series are cointegrated. If, however, the computed absolute value of the t statistic is less than the absolute value of the critical Engle-Granger tau statistic, the hypothesis that the estimated residual is non-stationary is accepted, meaning that the individual time series are not cointegrated.

3.2.3 Summary: Stationarity and cointegration

Thus far, this section has described the estimation procedure which will be used in the data analysis in this study. The procedure begins with examining the characteristics of the data. As it is time series data, attention is paid to the spurious regression problem in order to ensure that misleading results are not obtained by neglecting to check whether the time series data is stationary or not. Dickey-Fuller and Augmented Dickey-Fuller tests are used to test for stationarity and to determine the order of integration of the data. Even if the data is non-stationary, valid results can still be obtained if the variables are all cointegrated. If the

variables are non-stationary but are found to be cointegrated, then the cointegrating regression which is obtained from these variables has the property of super consistency, meaning that it is a stable function and no loss of information occurs since the variables are expressed in their level forms. The cointegrating regression thus obtained expresses the long-run meaningful relationship of the variables. Sections 3.3 and 3.4 apply the estimation procedure explained in this section to South African data.

3.3. Stationarity test results

Table 3.1 below shows the results of a unit root test of stationarity on every variable used in this study. The unit root test is done by regressing the first difference of each variable on the one period lagged value of each variable. The null hypothesis is that there is a unit root, i.e. each variable time series is non-stationary. If the computed absolute value of the t statistic exceeds the absolute value of the critical Dickey-Fuller tau statistic from tables, we reject the hypothesis that the time series is non-stationary. If, however, the computed absolute value of the t statistic is less than the absolute value of the critical Dickey-Fuller tau statistic, we accept the hypothesis that the time series is non-stationary. The 5 percent critical Dickey-Fuller(DF) tau statistic from tables is -2.93 (see Appendix A of this thesis). The absolute value of this DF tau statistic from tables will be compared with the computed absolute value of the t statistic for each of the variables to find out whether the hypothesis that the time series is non-stationary should be accepted or rejected.

Table 3.1 below shows the unit root test results for different time series variables used in this study. From Table 3.1 it can be seen that, in absolute terms, the computed t value of the indirect measure of capital flight (CFIND), the change in the degree of exchange rate over/undervaluation (DOVAL), and the log of political instability index (LNINST) are less than Dickey-Fuller tau statistic of -2.93. Thus we accept the null hypothesis that CFIND, DOVAL and LNINST time series are all non-stationary.

However, in absolute terms, all the computed t values of the capital flight balance of payments measure (CFBP), the change in the interest rate differential (DIDIFF), GDP growth rate (GROWTH), the change in the log of political freedom index (DLNFREE), the financial liberalization dummy (D80) and the gold price boom measure (GOLD) are greater than the critical Dickey-Fuller tau statistic of -2.93. So CFBP, DIDIFF, GROWTH, DLNFREE, D80 and GOLD are all stationary time series. Thus we cannot be sure when running a regression with these variables that a meaningful relationship exists between them. We turn to the test for cointegration in section 3.4.

Table 3.1. Stationarity test results

Variable name	t	Results
CFBP	-3.775	Stationary
CFIND	-2.476	Non-stationary
DIDIFF	-4.503	Stationary
GROWTH	-4.486	Stationary
DOVAL	-1.991	Non-stationary
DLNFREE	-4.868	Stationary
LNINST	-1.776	Non-stationary
D80	-9.798	Stationary
GOLD	-5.657	Stationary

Source: Researcher's own findings.

3.4. Cointegration test results

Having performed the unit root test of stationarity for all the variables used in the model, it was found that some individual time series are non-stationary while others are stationary. Despite this, a linear combination of the variables used in the model might be stationary. The linear combination of the variables used in the model is represented by the residuals of the model. A test of stationarity will be done on these residuals to determine if they are stationary or not. If the residuals are found to be stationary, then it will mean that the variables used in the model are cointegrated and it is assumed that despite some individual time series in the model being non stationary, there is a stable, long-run relationship between the individual time series used in the model.

Table 3.2 shows the results of a unit root test of stationarity on the residuals (U_{t1} , U_{t2}) from a model with the balance of payments measure of capital flight as a dependent variable (U_{t1}) and a second model with the indirect measure of capital flight as a dependent variable (U_{t2}). The unit root test is done by regressing the first difference of the residuals from each model on the one period lagged value of the residuals from each model. The null hypothesis is that there is no cointegration. If the computed absolute value of the t statistic exceeds the absolute value of the critical Engle-Granger tau statistic from tables, it means that the residuals are stationary and so the individual time series are cointegrated.

The 10 percent critical Engle Granger tau value from tables is 4.42. (see Appendix B of this thesis). From Table 3.2 it can be seen that, in absolute terms, all the computed t values are greater than the 10 percent critical Engle-Granger tau value, both residuals are stationary, so the individual time series are cointegrated. It is not ideal that we use the 10 percent level as this is greater than the conventionally accepted norm. However, when using the indirect measure of capital flight we find cointegration at the 5 percent level. Despite this we present the regression results using both methods in subsequent sections.

Table 3.2. Cointegration test results

	t	Results
U_{t1}	-4.554	Cointegrated
U_{t2}	-4.845	Cointegrated

Source: Researcher's own findings.

3.5 Estimated equations

Having found that the variables used in the model are cointegrated, we estimate equations 2.3 and 2.4 (page 26) using ordinary least squares (OLS). Tables 3.3 and 3.4 show the estimated equations.

Table 3.3. Estimated regression equation with CFBP as a dependent variable

Coefficient

		Unstandardized Coefficients		Standardized Coefficients	t	Observed significant level
Model		B	Std. Error	Beta		
1	(Constant)	-2353.353	559.759		-4.204	.000
	DIDIFF	89.708	28.625	.248	3.134	.005
	GROWTH	-13.54	17.353	-0.067	-0.78	.443
	DOVAL	3169.811	389.182	.770	8.145	.000
	DLNFREE	295.677	453.939	.053	.651	.521
	LNINST	311.228	63.998	.423	4.863	.000
	D80	1189.904	360.552	.308	3.300	.003
	GOLD	-598.425	381.949	-.155	-1.567	.130
R ² = 0.860		DW = 1.721				

Dependent Variable: CFBP

Source: Researcher's own findings.

Table 3.4. Estimated regression equation with CFIND as a dependent variable

Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Observed significant level
Model		B	Std. Error	Beta		
2	(Constant)	-6430.845	1404.107		-4.580	0
	DIDIFF	458.959	71.803	0.573	6.392	0
	GROWTH	-51.786	43.529	-0.117	-1.190	0.246
	DOVAL	2977.746	976.230	0.327	3.050	0.01
	DLNFREE	3179.778	1138.666	0.258	2.793	0.01
	LNINST	900.564	160.533	0.553	5.610	0
	D80	2122.140	904.412	0.248	2.346	0.028
	GOLD	-55.491	958.086	-0.006	-.058	0.954
R ² = 0.820		DW = 1.336				

Dependent Variable: CFIND

Source: Researcher's own findings.

In Tables 3.3 and 3.4 above, the estimated parameter values are of the correct sign, as initially expected. Of the seven coefficients reported using the balance of payments measure in Table 3.3, three are statistically insignificant. These are the growth effect, the absence of political freedom and the gold price boom effect. Only two of the seven coefficients reported using the indirect method in table 3.4 are statistically insignificant. These are the growth effect and the gold price boom effect. Of particular interest is that when using the balance of payments method of capital flight, we find the political freedom index to be statistically insignificant. However, when using the indirect method of capital flight, we find that the political freedom index has a stronger (in size) and statistically significant coefficient. This may be due to the long term bias of the indirect method. In addition this thesis finds that the coefficient for the political instability index is positive and statistically significant for both measures of capital flight. In fact our results show that a 1 *percent* increase in political instability index causes capital flight to increase by at least 0.4 *percent*.

A coefficient of correlation (R^2) is a summary measure that tells how well a sample regression line fits the data. It measures a proportion of the variation in a dependent variable accounted for by the explanatory variables. The fit of the model is said to be “better” the closer is R^2 to 1. The R^2 value reported in Table 3.3 is 0.860. This is a good fit since it implies that about 86 *percent* of the variation in CFBP is explained jointly by the explanatory variables in Table 3.3. It can also be seen in Table 3.4 that the R^2 value is 0.820 for our second dependent variable. This is a good fit since it shows that about 82 *percent* of the variation in CFIND is explained jointly by the explanatory variables in Table 3.4. Both R^2 values in Tables 3.3 and 3.4 show a good fit. Comparing R^2 value with the Durbin Watson (DW) statistic, we find that the DW statistic is greater than the R^2 value for both measures of capital flight. Based on this observation we conclude that spuriousness does not exist in our regression results hence supporting the findings of section 3.4 (page 66-67).

Responsiveness to risk proxies is mixed. CFBP shows more response to changes in the degree of exchange rate overvaluation than CFIND. However, CFIND seems to be more responsive to interest rate differential than CFBP.

The balance of payments approach to capital flight (CFBP) is more responsive to the degree of over/undervaluation of the exchange rate than the indirect approach to capital flight (CFIND). This is because CFBP measures short-term capital outflows which are more responsive to the changes in the exchange rate over/under valuation. In Tables 3.3 and 3.4 it can be seen that the CFIND measure is more responsive to the interest rate differential than the CFBP measure. This may be due to the fact that the CFIND is biased towards long-term capital outflows which are more responsive to the long-term interest rate differentials.

Moreover, both measures of capital flight show a response to the financial liberalization of 1980s. For both measures of capital flight, there was a capital outflow as a result of the 1980s financial liberalization, although in different magnitudes.

The results obtained from the estimated models support the hypothesis that political instability leads to an increase in the magnitude of capital flight. This is confirmed from the estimated models, which show that both measures of capital flight irrespective of being CFBP or CFIND are sensitive to the political instability index. Section 3.6 compares the present researcher's results with the results obtained by Fedderke and Liu.

3.6. A comparison with Fedderke and Liu's results

Since the main methodology used in this study was the replication of Fedderke and Liu's study (1999), this section will compare replicated results obtained in this study and the results obtained by a study conducted by Fedderke and Liu (1999). The object is to find out whether or not there are any differences between the replicated results and the original results of Fedderke and Liu. Table 3.5 shows the expected signs and sizes of the coefficients from the estimated regression equation. Table 3.6 compares the signs and sizes of the

regression equation estimated by Fedderke and Liu, with the signs and sizes estimated by this thesis to determine if there are any differences. Since Fedderke and Liu reported their results by using a capital flight measure based on the indirect method (CFIND), we also use CFIND measure for consistency.

South Africa's capital flows showed a high variability during the period 1960 to 1995. The high variability of South Africa's capital flows suggest using a robust estimator in order to further improve the quality and reliability of the present author's estimates. This is achieved by using the least absolute errors (LAE) estimator. Table 3.5 shows the explanatory variables used in this thesis and their expected signs.

Expected results

Table 3.5. Expected signs of the variables used in this study.

Description	Variable name	Expected sign
RATES OF RETURN		
An exchange rate adjusted interest differential, $i_f - (i_d - e)$. US treasury bill rate is used for the foreign interest rate i_f , while a South African treasury bill rate is used for a domestic interest rate i_d . The exchange rate, e , is the end of the period principal rand/dollar rate. All the data were obtained from the IMF's International Financial Statistics (IFS) Yearbook. Since we are dealing with capital flows, the first difference of the exchange rate adjusted interest differential will be used, i.e. DIDIFF.	DIDIFF	Positive
Percentage change of South Africa's real GDP (at 1990 prices). The data were obtained from the IMF's International Financial Statistics (IFS) Yearbook.	GROWTH	Negative
RISK VARIABLES		
Over/under valuation of the exchange rate in terms of the purchasing power parity, with 1990 as a base year. $PPP = (CPI_{SA} / CPI_{US}) (R/\$)$. The data were obtained from the IMF's International Financial Statistics Yearbook (IFS). A positive figure indicates undervaluation. Since capital flows are being dealt with, the first difference is used, denoted as DOVAL.	DOVAL	Positive

Political freedom index (Source: Fedderke <i>et al.</i> , 1999). As this index <u>rises</u> , political freedom <u>falls</u> . The variable is used in first differences (DLNFREE). No expected sign is postulated since political liberalization could either improve macroeconomic conditions through improved legitimacy of the ruling government or worsen macroeconomic conditions through heightened populist pressure. As part of this, note that DLNFREE can be statistically insignificant, but this means the two proposed effects cancel each other out.	DLNFREE	No expected sign
A political instability index (Source: Fedderke <i>et al.</i> , 1999). As this index <u>rises</u> , political instability <u>rises</u> .	LNINST	Positive
OTHER VARIABLES		
A dummy for the financial liberalization of 1980	D80	Positive
A dummy for the gold price boom of 1981-1984	GOLD	Negative

Source: Fedderke and Liu (1999:15).

Obtained results

Since Fedderke and Liu reported standardized coefficients of only five of the most important variables used in their study, five variables from this study are used for comparison with Fedderke and Liu's results. Fedderke and Liu's results are compared with the present researcher's results in Table 3.6.

Table 3.6 Fedderke and Liu’s results compared with the present researcher’s results.

Table 3.6a

	Fedderke and Liu's results(OLS). Standardized coefficients		
	Capital flight measure based on indirect method (CFIND).	t	Observed significant level
DIDIFF	0.11	1.53	0.15
GROWTH	-0.39	-3.58	0.00
DOVAL	0.15	2.18	0.04
DLNFREE	0.11	1.53	0.15
LNINST	0.60	5.62	0.00

Source: Fedderke and Liu(1999:26-28).

Table 3.6b

	Reseacher's results (OLS). Standardized coefficients		
	Capital flight measure based on indirect method (CFIND).	t	Observed significant level
DIDIFF	0.573	6.392	0
GROWTH	-0.117	-1.190	0.246
DOVAL	0.327	3.050	0.01
DLNFREE	0.258	2.793	0.01
LNINST	0.553	5.610	0

The present researcher's own findings.

A comparison of this study and the study done by Fedderke and Liu (1999) in Table 3.6 above shows the estimated standardized coefficients are of the same sign. Of the five coefficients reported by Fedderke and Liu, two are statistically insignificant. These are the interest rate differential effect and the absence of political freedom. When these results were replicated, this study finds that only the growth effect is statistically insignificant. Thus the

replication reverses three of Fedderke and Liu's hypothesis tests. Two of Fedderke and Liu's insignificant effects (the interest rate differential and the absence of political freedom) were found by this thesis to be significant. The effect of growth was found by this thesis to be insignificant. These differences arise as a result of our repeating the data collection experiment of Fedderke and Liu.

The Reserve Bank, or institutions responsible for collecting and publishing economic data, periodically revise published data, so that the value of a variable for a particular time period (for example GDP in 1978:II) differs in different issues (volume or number) of the same publication. Slight differences in data values due to this revision, or slight differences in the numerical precision of computer programs, may produce sharply different parameter estimates. This is another reason why our replication reverses three of Fedderke and Liu's hypothesis tests. One possible way to resolve these differences is to use a robust estimator to test the hypotheses.

A robust estimator is used to reduce the effects of outliers and measurement errors in the data. Robust estimation means an estimation technique which is robust with respect to the presence of gross errors and outliers in the data. The technique which is used for robust estimation in this study is known as the least absolute errors (LAE) technique. If our replicated data set has any large errors, differences between robust estimates and OLS estimates would be evident.

Our data set can still be used for hypothesis testing using the LAE estimator as this entails a comparison of the estimated coefficients with zero. Using the LAE estimator (a robust estimator) shown in table 3.7b, we find that of the five estimates all are statistically significant.

A comparison of the OLS and LAE estimates

Table 3.7a Ordinary Least Squares (OLS) estimates

	Researcher's results (OLS). Standardized coefficients		
	Capital flight measure based on indirect method (CFIND).	t	Observed significant level
DIDIFF	0.573	6.392	0
GROWTH	-0.117	-1.190	0.246
DOVAL	0.327	3.050	0.01
DLNFREE	0.258	2.793	0.01
LNINST	0.553	5.610	0
D80	0.248	2.346	0.028
GOLD	-0.006	-0.058	0.954

Source: Researcher's own findings.

Table 3.7b Least Absolute Errors (LAE) estimates

Variable's name	Least Absolute Error estimation. Standardized Coefficients	t	Observed significant level
DIDIFF	0.4843	18.61	0.000
GROWTH	-0.4244	-11.43	0.000
DOVAL	0.6686	21.07	0.000
DLNFREE	0.2098	7.478	0.000
LNINST	0.2266	9.408	0.000
D80	0.2939	13.79	0.000
GOLD	-0.0178	-0.8062	0.428

Source: Researcher's own findings.

A statistically significant coefficient for GROWTH from Fedderke and Liu which we reversed using OLS and our data set, becomes statistically significant with the robust estimator. Thus we are able to replicate Fedderke and Liu's results in a weak sense. By weak we mean using a robust estimator to confirm our replicated results.

Of all the hypothesis tests, the most important one for Fedderke and Liu is that political instability be positive and statistically significant. The result is unchanged in our replication (Table 3.7a) and confirmed results using the LAE estimator (Table 3.7b). Of particular interest is that we find with the indirect method of capital flight, a stronger (in size) and statistically significant coefficient for a political freedom index. Compare the 0.258 in table 3.7a with 0.11 in table 3.6a.

In Tables 3.7a and 3.7b, we see that the change in the size of coefficients can be large. Out of seven coefficients three change in size by a substantial amount. The coefficient for GROWTH and DOVAL increase substantially, while that of LNINST falls by a large amount. This indicates that the data set we are using is not as "clean" as one would like it to be. Further research would do well to examine the data for possible problem data points.

In Table 3.8 we compare the standard errors of our regression model estimated by OLS with that of LAE. It can be seen from the table that standard errors from LAE technique are smaller than the standard errors from the OLS technique. It is these lower estimates of the standard errors that are in part responsible for the five statistically significant results in Table 3.7b for the LAE.

Table 3.8 Standard errors from LAE and OLS.

Variable name	Standard error from the present researcher's OLS	Standard error from LAE
Constant	1404.107	139.8
DIDIFF	71.803	17.62
GROWTH	43.529	0.9823
DOVAL	976.230	207
DLNFREE	1138.666	261.3
LNINST	160.533	17.46
D80	904.412	182.1
GOLD	958.086	0.2269

Source: Researcher's own findings.

3.7. Implication for the current situation in South Africa

Examining the changes in the degree of exchange rate over/under valuation in South Africa for the period 1960-1995 is of particular importance to South Africa, because it can help explain the factors responsible for changes in the degree of exchange rate over/under valuation in South Africa. This information helps monetary authorities design appropriate policies for stabilizing the exchange rate.

Based on the regression equation estimated in this study, it is possible to calculate by how much the change in the degree of the exchange rate has been undervalued or overvalued for different levels of capital flight. This can be achieved by making the variable DOVAL the subject of the formula from the regression equation estimated in this study, then substituting into the equation the maximum, average and minimum levels of capital flight over the period 1960-1995, to see the effect of different levels of capital flight on the degree of exchange rate over/under valuation. Other explanatory variables are kept constant at their average values. Equation 3.13 is the estimate of equation 2.4 (page 26) making DOVAL the subject of the formula.

$$\text{DOVAL} = 2.15964 + 0.00034\text{CFIND} - 0.15413\text{DIDIFF} + 0.01739\text{GROWTH} - 1.06785\text{DLNFREE} - 0.30243\text{LNINST} - 0.71267\text{D80} + 0.01864\text{GOLD} \dots\dots\dots 3.13$$

Table 3.9 shows DOVAL values for different levels of capital flight. A positive figure for DOVAL indicates undervaluation, while a negative figure indicates overvaluation.

Table 3.9. DOVAL values for different levels of capital flight

Levels of CFIND	DOVAL value	Over/undervaluation
Maximum level of capital flight	1.61825	Highly undervalued
Average level of capital flight	0.19809	Undervalued
Minimum level of capital flight (capital inflows exceeding outflows)	-1.27222	Overvalued

Source: Researcher's own findings.

After substituting into equation 3.13 the maximum, average and minimum levels of capital flight, Table 3.9 shows that DOVAL values were 1.61825, 0.19809 and -1.27222, respectively. This indicates that, during the period 1960-1995, both maximum and average levels of capital flight led to the undervaluation of the exchange rate. This undervaluation of the exchange rate was caused mainly by capital flowing out of South Africa in the 1970s, mid-1980s and early-1990s due to political risk and uncertainty which prevailed in South Africa for much of that period.

However, using the minimum level of capital flight (more capital inflows than capital outflows) leads to an overvaluation of the exchange rate. The gold price boom of the early 1980s led to a brief period in which more capital flowed into South Africa. During this brief period capital flight was at its minimum level.

This finding can be used to explain the undervaluation of the rand at the time of writing. The South African rand is currently undervalued against the US dollar. Capital flight from the South African economy seems to be behind the undervaluation of the rand, as capital flight causes a shortage of dollars in the economy hence depreciating the rand below its equilibrium value. Some of the factors causing this capital flight are as follows: Firstly, the

emerging market classification of South Africa makes the country vulnerable to capital flight. Renewed concerns of investors with regard to this group of markets resurfaced as a result of Argentina defaulting on its external debt. This creates negative investor sentiment for the emerging markets, as they are considered very risky and contagious. These negative sentiments, combined with the fact that South Africa's financial markets are among the most sophisticated and liquid in the developing world, makes the rand an easy and open target, leading to capital flight. Secondly, the contagion fears linked to the Zimbabwean land crisis by investors still persist despite the government's insistence that it will not tolerate land invasions in South Africa and despite recent criticism of the Zimbabwean president by the South African president, Thabo Mbeki. Thirdly, South Africa has a high rate of violent crime. The combination of these frightful factors is an important reason for capital flight from South Africa.

Options available to the Reserve Bank include raising short-term interest rates. The Reserve Bank could raise the repo rate, currently at 9.5 percent, and in the process push up the prime lending rate, which at 13 percent stands at a 20-year low. But the Reserve Bank would only do so if it felt the faltering rand was creating inflationary pressure because of the rising price of imports. However, this option has a disadvantage in that higher rates will reduce the already sluggish economic growth, seen as a key to attracting foreign capital and bolstering the rand.

The rand's rapid depreciation means that an increasing number of investors want to move cash offshore and the currency could continue to depreciate below its equilibrium level. One option is to tighten exchange controls, at least in the short-term, to stop the outflow of capital. A disadvantage of this option is that it could signal even greater macroeconomic policy weakness on the part of the government leading to further capital outflows.

The government should increase its efforts to reduce the high crime rate in South Africa. This includes strengthening the police force to deal with criminals more effectively, by providing more training, better pay and better equipment to deal with criminals. The formation

of a “Scorpions” unit to deal with serious criminal offences is a step in the right direction. More needs to be done, however, to strengthen the police force.

3.8. Summary and conclusions

Our results can be summarized under three headings; thesis results, a comparison with Fedderke and Liu’s results and the explanation for the current undervaluation of the rand. Our thesis results suggest that both political and economic factors are important in explaining capital flight from South Africa. The economic factors include the interest rate differential and the exchange rate over/undervaluation. Political factors include political instability which exerts more influence than other political factors. Our major finding is that the lack of political freedom is a statistically significant variable when using the indirect measure of capital flight.

Using the balance of payments measure, capital flows respond to the interest rate differential, exchange rate over/undervaluation, political instability and financial liberalization. However, the indirect measure responds to all the above including the lack of political freedom. It is of some interest that the growth rate does not impact on capital flight using the balance of payments measure, but there is weak support for this effect using the indirect measure.

In comparing our results with the results obtained by Fedderke and Liu, we find that Fedderke and Liu’s findings for South Africa’s capital flight appear to be valid. The replication of Fedderke and Liu’s study (1999) has clearly shown that their major finding is unchanged and political risk as measured by the political instability index remains statistically significant with our replication. This finding is confirmed when using a robust estimator.

The results obtained here provide a reason for the current undervaluation of the rand. Capital flight from the South African economy seems to be behind the current undervaluation of the rand, as capital flight causes a shortage of dollars in the economy, hence depreciating the rand below its equilibrium value.

Chapter 4 gives recommendations on the best policies to attract foreign capital inflows to South Africa based on these results and concludes the thesis.

CHAPTER 4

GENERAL CONCLUSIONS

It is important to understand the causes of capital flows in South Africa for economic policies to be effective in attracting capital inflows. In constructing the model used in this study, capital flows in South Africa are found to be affected by the interest rate differential as well as by risk factors such as exchange rate over/undervaluation, political instability and financial liberalization in the 1980s (see section 3.5, page 67-70).

The concept of differentiating “flight” capital measured by a balance of payments measure (CFBP) from capital outflows measured by an indirect measure (CFIND), is based on the prior assumption that flight capital, as measured by the balance of payments measure, shows higher sensitivity to political risk than capital outflows measured by the indirect method. However, it is found that the separation of capital flows into “flight” and other capital flows only changes one of the hypotheses. The results showed that a 1 *percent* increase in the political instability index caused capital flight (under both measures) to increase by at least 0.4 *percent*, thus supporting the hypothesis that political instability leads to an increase in the magnitude of capital flight. This result is also statistically significant. The lack of political freedom only becomes statistically significant with the indirect measure of capital flight. This may be due to the long term bias of the indirect measure (see page 68).

Capital flight, as measured by both capital flight measures, shows sensitivity to political risk. The level of political instability, as measured by a political instability index, played a very important role in stimulating capital flight from South Africa. Thus the answer to the key question posed in chapter 1 (page 13) is “yes” only for the political instability index.

It is thus important that appropriate policies for removing uncertainty arising from political instability in South Africa be put in place so as to attract the inflow of foreign capital into South Africa. Policies such as strengthening the capacity of the police force to reduce the high rate of political violence and crime will encourage investors to return. Clearer and more appropriate policies should be put in place to remove uncertainties surrounding the land distribution problem in South Africa. Uncertainty surrounding the land issue in South Africa has been partly responsible for scaring away potential investors. Stamping out corruption in the government through measures which ensure more transparency, accountability and credibility of government officials should be given a high priority.

The results of the present study enabled the author to understand the reasons behind the current undervaluation of the rand. Capital flight from the South African economy seems to be behind the current undervaluation of the rand, as capital flight causes a shortage of dollars in the economy, hence depreciating the rand below its equilibrium value. This capital flight has been caused by several factors. These include the classification of South Africa as an emerging market, which makes the country vulnerable to capital flight, as investors consider emerging markets very risky. Argentina's default on its foreign debt increased investors' fears of contagious effects to other emerging markets, hence leading to capital flight from South Africa. The Zimbabwean land crisis and the high crime rate in South Africa negatively affected capital flows. The combination of these factors is an important reason behind capital flight from South Africa. Policies to stop this capital flight include raising the short-term interest rate, tightening exchange controls, at least for a short period and strengthening the capability of the police force to reduce the crime rate (see section 3.8, page 78-81).

Although the growth effect was not statistically significant, our robust estimation indicated otherwise. The implication arising out of this robust result is that, policies which enhance economic growth, together with policies which lower inflation and fiscal deficits, create an atmosphere of macroeconomic stability which enhances economic growth thus providing attractive rates of returns to potential investors. These policy objectives should continue to be a central concern for South African policy-makers, especially for long-term capital flows.

It must be reiterated that the conceptual and measurement problems involved in the derivation of data on capital flight as well as the small sample size used in this study, are such that the estimates presented in this thesis, and consequently, the regression results based on their estimates, should be interpreted with caution. Nevertheless, the econometric analysis shows that the political instability index has a statistically robust relationship to capital flight and concludes there is support for the hypothesis that political instability leads to an increase in the magnitude of capital flight.

The study supports Fedderke and Liu's claim (1999: 29-30) that capital flows for South Africa show a sensitivity to political risk. Greater political rights and political stability in South Africa help reduce capital outflows. However, this thesis finds (by replicating Fedderke and Liu's study) that political instability, as measured by the political instability index had a greater impact in stimulating capital flight from South Africa between 1960 and 1995 than the political freedom index hence confirming Fedderke and Liu's hypothesis and reported results.

Appendix A

Critical values for the Dickey-Fuller test

<i>Sample Size T</i>	<i>Significance Level</i>							
	0.01	0.025	0.05	0.01	0.90	0.95	0.975	0.99
<i>No Constant Included, τ_1</i>								
25	-2.66	-2.26	-1.95	-1.60	0.92	1.33	1.70	2.16
50	-2.62	-2.25	-1.95	-1.61	0.91	1.31	1.66	2.08
100	-2.60	-2.24	-1.95	-1.61	0.90	1.29	1.64	2.03
250	-2.58	-2.23	-1.95	-1.62	0.89	1.29	1.63	2.01
300	-2.58	-2.23	-1.95	-1.62	0.89	1.28	1.62	2.00
∞	-2.58	-2.23	-1.95	-1.62	0.89	1.28	1.62	2.00
<i>Constant Included, τ_2</i>								
25	-3.75	-3.33	-3.00	-2.62	-0.37	0.00	0.34	0.72
50	-3.58	-3.22	-2.93	-2.60	-0.40	-0.03	0.29	0.66
100	-3.51	-3.17	-2.89	-2.58	-0.42	-0.05	0.26	0.63
250	-3.46	-3.14	-2.88	-2.57	-0.42	-0.06	0.24	0.62
300	-3.44	-3.13	-2.87	-2.57	-0.43	-0.07	0.24	0.61
∞	-3.43	-3.12	-2.86	-2.57	-0.44	-0.07	0.23	0.60
<i>Constant and Linear Trend Included, τ_3</i>								
25	-4.38	-3.95	-3.60	-3.24	-1.14	-0.80	-0.50	-0.15
50	-4.15	-3.80	-3.50	-3.18	-1.19	-0.87	-0.58	-0.24
100	-4.04	-3.73	-3.45	-3.15	-1.22	-0.90	-0.62	-0.28
250	-3.99	-3.69	-3.43	-3.13	-1.23	-0.92	-0.64	-0.31
300	-3.98	-3.68	-3.42	-3.13	-1.24	-0.93	-0.65	-0.32
∞	-3.96	-3.66	-3.41	-3.12	-1.25	-0.94	-0.66	-0.33

From Fuller (1976)

Appendix B

Critical Engle-Granger and CRWD values

Number of Var's N	Sample Size T	EG Critical Values		
		Significance Level		
		1%	5%	10%
1 ^a	50	2.62	1.95	1.61
	100	2.60	1.95	1.61
	250	2.58	1.95	1.62
	500	2.58	1.95	1.62
	∞	2.58	1.95	1.62
1 ^b	50	3.58	2.93	2.60
	100	3.51	2.89	2.58
	250	3.46	2.88	2.57
	500	3.44	2.87	2.57
	∞	3.43	2.86	2.57
2	50	4.32	3.67	3.28
	100	4.07	3.37	3.03
	200	4.00	3.37	3.02
3	50	4.84	4.11	3.73
	100	4.45	3.93	3.59
	200	4.35	3.78	3.47
4	50	4.94	4.35	4.02
	100	4.75	4.22	3.89
	200	4.70	4.18	3.89
5	50	5.41	4.76	4.42
	100	5.18	4.58	4.26
	200	5.02	4.48	4.18

From Engle and Yoo (1987, p. 157)

Appendix C : Data sources.

i) Capital Flight Balance of Payments Measure (CFBP).

Source: IMF Balance of Payments Yearbooks 1970-2000, summing up codes 1994734, 1994748, 1994798, 1994998 (Latest Versions).

ii) Capital Flight Indirect Measure (CFIND).

Sources: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.
South Africa's National Accounts: Supplement to the South African Reserve bank quarterly bulletin, June 1994.

iii) Exchange Rate Adjusted Interest Rate Differential.

Source: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

iv) GDP Growth Rate

Source: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

iv) Over/undervaluation of the exchange rate.

Source: IMF International Financial Statistics Yearbooks 1989-1990, 1996, 1998, 2001.

v) Political freedom index and political instability index.

Source: Fedderke, J., de Kadt, R., and Luiz, J. 1999. "Indicators of Political Liberty, Property Rights and Political Instability in South Africa 1935 -1997." ERSA Working Paper No.4. University of Witwatersrand, South Africa.

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