

**EXCHANGE RATE RISKS IN TRADE AND INVESTMENT
BETWEEN SOUTH AFRICA AND THE DEVELOPED
COUNTRIES**

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DISSERTATION

presented as part fulfillment
of the degree

MASTERS OF COMMERCE

in the

SCHOOL OF ECONOMIC SCIENCES

at the

VAAL TRIANGLE CAMPUS

of the

NORTH-WEST UNIVERSITY

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July 2009

Acknowledgements

I would like to thank and acknowledge the contributions of the following persons in the completion of this dissertation:

Mr. Andre Mellet, who acted as my supervisor for his guidance, enthusiasm, creative input, constructive criticism and above all, his love of the subject.

Prof. Pierre Lucouw, who acted as my co-supervisor, for the many hours he spend, his valuable input and ideas in approaching an elusive concept.

Mr. Henk Van Tol who dedicated many hours with the linguistic editing.

Marcella Jones Language Services for the final linguistic editing.

My parents who are far away in China, for their life time of support, understanding, motivation and all their love.

My aunt, Ms Wang Yuqin, for always being there for me in every step of my life, providing all the support she could give.

Cui Zhang

July 2009

Abstract

The current international monetary system is very different from that of a few decades ago. Many of the old restrictions that had been placed on currency and capital movements between countries have fallen away in favour of a much more liberal international payment and investment system. The global financial arena is now characterized by greater currency instability, volatility and heightened financial risks. Exchange Rate risk is one of the complex topics in the economic world. Since there are so many factors in the financial market that influence a country's currency value, it becomes very risky for importers, exporters and portfolio investors to be involved in the international trade and financial markets.

The purpose of this study is to gain an understanding on how the major economic indicators have an impact on the decision-making of the importers, the exporters and investors, to further influence the volatility of the Rand; and to provide various hedging and arbitraging strategies to reduce foreign exchange rate risks.

The layout of the study is based on six chapters. Chapter 1 focuses on the background and scope of the study, mainly explaining the reasons, objectives and methodology of this study. An historical overview takes place in chapter 2, where a number of different exchange rate systems will be discussed. Chapter 3 reviews different exchange rate theories in order to support the empirical study in the next chapter. Chapter 4 focuses on an investigation and comparative study on how foreign investments and trade with developed countries have an impact on currency values and visa-versa. A number of management strategies for reducing exchange rate risks are introduced in chapter 5. Chapter 6 is the summary and conclusion of the research.

Contents

Acknowledgement	ii
Abstract	iii
List of Figures	vii
List of Tables	vii
List of Abbreviations	viii

Chapter 1 Introduction and Problem Statement

1.1	Introduction	1
1.2	Problem Statement	3
1.3	Objectives	4
1.3.1	Primary Objective	4
1.3.2	Secondary Objectives	4
1.4	Demarcation of the Study	5
1.5	Research Methodology	5
1.5.1	Literature Study	5
1.5.2	Empirical Investigation	6
1.6	Layout of the study	6

Chapter 2 An Overview of Different Monetary and Exchange Rate Systems

2.1	Introduction	8
2.2	Exchange Rate Systems	9
2.2.1	The Gold Standard	9
2.2.2	The Bretton Woods System	11
2.2.3	The European Monetary System (EMS)	13
2.2.4	The Current International Monetary System	14
2.2.4.1	Floating Exchange Rate System	15
2.2.4.2	Alternative Exchange Rate Regimes	18
2.3	Monetary and Exchange Rate Systems in South Africa	20
2.3.1	The First Phase	21
2.3.2	The Second Phase	23
2.3.3	The Third Phase	24
2.3.4	The Fourth Phase	26
2.3.4.1	Inflation Targeting	27
2.3.4.2	South Africa's Current Exchange Rate System	28
2.4	Conclusion	30

Chapter 3 Exchange Rate Theory

3.1	Introduction	32
3.2	Exchange Rate	33
3.2.1	Real and Effective Exchange Rate	34
3.2.2	Price of a currency	35
3.3	Exchange Rate Determination	37
3.3.1	Purchasing Power Parity (PPP)	37
3.3.2	Balance of Payments (BOP) Approach	39
3.3.2.1	The Balance of Payments (BOP)	40
3.3.2.2	The Balance of Trade as a Determinant of the Exchange Rate	42
3.3.2.3	The Absorption Approach to the Balance of Trade	43
3.3.2.4	The Monetary Approach to the BOP	44
3.3.3	Asset Approach to Exchange Rate Determination	45
3.3.3.1	Monetary Approach Model	46
3.3.3.2	Portfolio Approach	48
3.4	Equilibrium Exchange Rate Theory	49
3.4.1	Fundamental Equilibrium Exchange Rate (FEER)	49
3.4.1.1	The FEER Model	50
3.4.1.2	Model Structure	51
3.4.2	Desired Equilibrium Exchange Rate (DEER)	53
3.4.2.1	The General Concept of the DEER	54
3.4.2.2	The Advantages and Disadvantages of the DEER	55
3.4.2.3	Hysteresis in the DEER	55
3.4.3	Natural Real Exchange Rate (NATREX)	57
3.4.3.1	The NATREX Approach	57
3.4.3.2	The NATREX Model	59
3.5	The Mundell-Fleming Model with Flexible Exchange Rate	61
3.5.1	Fiscal Policy	62
3.5.2	Monetary Policy	63
3.6	Conclusion	65

Chapter 4 International Transactions and Exchange Rate Fluctuation

4.1	Introduction	67
4.2	Research Methodology	68
4.3	Factors that Affect the Equilibrium Exchange Rate	68
4.3.1	Economic Factors	69
4.3.1.1	Balance of Payments	69
4.3.1.2	The Impact of Inflation on Exchange Rate	70
4.3.1.3	Exchange Rate and Interest Rate	71
4.3.1.4	Monetary Supply	73
4.3.1.5	Gross Domestic Product (GDP)	74

4.3.2	Trade	74
4.3.2.1	Factors Considered by Exporters for Trade Decisions	75
4.3.2.2	Factors Considered by Importers for Trade Decisions	76
4.3.3	Investment	76
4.4	Selected Periods of Rand Volatility in Terms of Trade and Investment	79
4.4.1	Introduction	79
4.4.2	The Reasons for Rand Volatility	81
4.4.2.1	Rand Depreciation: January 1996-November 1996	82
4.4.2.2	Rand Appreciation: November 1996 – April 1997	84
4.4.2.3	Rand Depreciation: January 1998– July 1998 and its recovery	86
4.4.2.4	Rand Depreciation: June 2001 – December 2001	89
4.4.2.5	Rand Appreciation: December 2001 – December 2004	91
4.4.2.6	Rand Depreciation: February 2006 – February 2008	93
4.5	Conclusion	98

Chapter 5 Management of Exchange Rate Risk

5.1	Introduction	100
5.2	Risk	100
5.3	Definition and Types of Exchange Rate Risk	102
5.4	Measurement of Exchange Rate Risk	103
5.5	Management of Exchange Rate Risk	107
5.5.1	Exchange Risk Management Methods	107
5.4.1.1	Flexibility	107
5.4.1.2	Predictions	108
5.4.1.3	Arbitrage Based Approaches	109
5.4.1.4	Hedging	111
5.5.2	Hedging Strategies	112
5.5.3	Hedging Benchmarks and Performance	113
5.5.4	Hedging and Budget Rates	114
5.5.5	Hedging Instruments for Managing Exchange Rate Risk	114
5.5.6	Risk Management Policies of Companies Quoted on JSE	118
5.6	Best Practices for Exchange Rate Risk Management	120
5.7	Responsibility for Exchange Rate Risk Management	121
5.8	Conclusion	122

Chapter 6 Summary and Conclusion

6.1	Introduction	123
6.2	Summary	123
6.3	Conclusion	125

Bibliography	127
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List of Figures

3.1	Flexible and Fixed Exchange Rate	36
3.2	The Portfolio Approach to Exchange Rate Determination	48
3.3	Internal and External Balance of DEER Approach	54
3.4	Hysteresis Effects	56
3.5	Mundell – Fleming Model	61
3.6	Fiscal Policy and Flexible Exchange Rate	63
3.7	Effects of an Increase Money Stock	64
4.1	Impact of Inflation on the Equilibrium Exchange Rate	70
4.2	The Real Effective Exchange Rate of the Rand 1996-2004	80
4.3	Real Effective Exchange of the Rand 1996 – 2004	82
4.4	Annual Portfolio Inflow (Liabilities) 1990 – 2004	87
4.5	Annual Portfolio Outflow (Assets) 1990 – 2004	87
4.6	Real Interest Rate Differentials between South Africa and the US, Germany, Japan and UK	88
4.7	Daily Nominal Effective Exchange Rate of the Rand	90
4.8	Terms of Trade and Commodity Prices	94
4.9	Real Import and Export 2006	95
4.10	Effective Exchange Rate of the Rand up to 2008	96
6.1	Exchange Rate of the Rand	125

List of Tables

3.1	Government Policy and Fiscal Policy under Flexible Exchange Rate	66
4.1	Balance of Payment on Current Account 2001 – 2002	92
4.2	Balance of Payment on Current Account 2003 – 2004	92
4.3	Summary Table	97
5.1	Big Mac Parity Rate	118

List of Abbreviations

BOP	Balance of Payments
BS-effect	Balassa-Samuelson effect
CA	Current Account
CPI	Consumer Price Index
CPIX	CPI excluding interest rates on mortgage bond
DEER	Desired Equilibrium Exchange Rate
EME	Emerging Market Economies
ECB	European Central Bank
ECU	European Currency Unit
EMS	European Monetary System
EMU	European Monetary Union
EU	European Unit
FDI	Foreign Direct Investment
FEC	Forward Exchange Contract
FEER	Fundamental Equilibrium Exchange Rate
GBP	Great Britain Pound
GDP	Gross Domestic Product
IAS	International Accounting Standard
IMF	International Monetary Fund
IVAR	Identified Vector Auto Regressions
JSE	Johannesburg Securities Exchange
KA	Capital Account
NATREX	Natural Real Exchange Rate
OR	Official Reserve
OTC	Over – the - Counter
PPP	Purchasing Power Parity
SAFEX	South African Futures Exchange
SAQB	South African Quarterly Bulletin
SARB	South African Reserve Bank
SARS	South African Revenue Services
SD	Statistical Discrepancy
SDR	Special Drawing Right
UIA	Uncovered Based Approach
UIP	Uncovered Interest Parity
UK	United Kingdom
USA	United States of America
VaT	Value – at - Risk

Chapter 1

Introduction and Problem Statement

1.1 Introduction

Economic prosperity gained importance when countries with different currencies engaged in business transactions. An economy could no longer be assessed on its own, but had to be measured in terms of the other economies with which it traded. The relationship between the economies of different countries affected the price of one currency in terms of the other currency. The exchange rate is not only a measure to facilitate business transactions, but it is also an indicator of the confidence in a country's political and economic policy. The factors that indicate the strength of an economy in terms of another economy and therefore exchange rate movements, is researched in this study. As all major macro economic events affect the exchange rate, exchange rate management can become an important base for other economic policy measures. It is one of the most important economic foundations for the consideration of economic policies.

For a business the price at which goods trade is very important for obvious reasons. A problem with transactions in other currencies is that the price can change without any direct action by one of the parties, but simply because the exchange rate changed. Only knowing what affects exchange rate movements is not sufficient. An understanding of the risk associated with foreign currency transactions and how to manage the risk is important for practical business applications.

Risk can be seen that, as a result of uncertainty, a negative outcome will result. Bessis (2006:19) states that exchange rate risk is the losses incurred when there are changes in the value of the currency or exchange rates. In other words, exchange rate risk refers to the possible different financial outcomes between the initial and ultimate transactions as a result of an exchange rate alteration. When the exchange rate moves, the price or value of goods and financial assets are affected. Because of the pervasive influence of exchange rates on an economy, it is usually unwise to allow the value of the domestic currency to fluctuate in a completely unfettered manner. On the other hand, an extremely restrictive central bank policy as far as exchange rates are concerned could stifle export performance and, ultimately, growth.

According to Lindert and Pugel (1996:532), exchange rate systems have changed remarkably over time: before the First World War, fixed exchange rates took the form of an international gold standard, where all countries tied their currencies to gold allowing unrestricted import and export of gold. After the Second World War, the world sought the advantages of the fixed

exchange rate system, and turned to the Bretton Woods System where the US Dollar was pegged to gold and the US was prepared to buy and sell unlimited amounts of gold at the official rate. In 1970s, the Bretton Woods system was terminated, and most of the major currencies were allowed to float to a certain degree.

Regarding the choice of exchange rate policies, Edwards (2001:3) indicates that, many countries have suffered a severe currency and financial crises since the late 1990s, with an overwhelming toll on their economies. Since then, Exchange rate policies have changed overtime because of the financial crises. The exchange rate regimes for different countries emphasise the existence of both fixed and floating exchange rate regimes. A country's general economic environment determines whether it will choose to have a fixed exchange regime, a floating exchange regime or even a managed exchanged regime.

Since the 1990s, there were a number of economic crisis that happened all over the world. Examples are given by TRISA (2007:141), such as the Mexican crisis in 1994, the Asian Crisis from 1997 to 1998, the Russian and Brazilian crises in 1999 and the Argentine currency crisis between 2001 and 2002. Every economic crisis brought many changes to the exchange rate systems and policies world wide. In May 1997, the speculative attack on the Czech crown turned out to be an eye opener for policy makers on the importance of early warning signals. These signals indicate that the existed economic policies are not consistent with the existing exchange rate regime.

Apart from an economic crisis, there never seems to be stability and certainty in the global economy. Prasad (2007:2) refers to some of the prevailing issues: currently, China's soaring foreign exchange reserves have created internal and external pressures on the balance of the economy, and introduced risks to the financial system. The American economy, on the other hand, has a huge trade deficit, and is now facing a sub-prime mortgage crisis and economic growth slowing down. While rising concerns about the global environment and associated energy shortages indicate that countries will have to invest in ever more energy-efficient and environmentally-friendly industrial processes in the future. This negative economic scenario could hamper certain countries' current account even more.

Under these circumstances, the issues relating to exchange rate management became an important concern for economic reform in South Africa due to the rapidly changing global environment. Exchange rates are one of the difficult topics in the economic world, since it is impacted by so many factors in an economy. Exchange rates are not only influenced by the economy of one country, but by the economies of many countries. Due to all the uncertainties, the risks involved are not always known and therefore difficult to manage. Aron *et al.* (1997:16) states that different regimes on floating exchange

systems were implemented, which significantly increased fluctuations in the exchange rate. The level of the real exchange rate to the equilibrium real exchange rate, together with its stability has an influenced on exports, imports and investment.

1.2 Problem Statement

The international monetary system presently in use is very different from that of a few decades ago. ITRISA (2007:139) states that many old restrictions placed on currency and capital movements among countries have fallen away in favour of a much more liberal international payment and investment system. In this regard, improvements in technology, have greatly speeded up and simplified the process of transferring funds internationally. Despite these advantages, the global financial arena is now also characterised by greater currency instability, volatility and heightened financial risk. This requires importers, exporters and investors to have a clear knowledge and understanding of exchange rate risk.

According to Bessis (2006:19), foreign exchange risk is the risk caused by losses due to value changes in a country's currency. It impacts the earnings on a company's revenue or the value of the company's assets and liabilities denominated in a foreign currency. In other words, exchange rate risk or currency risk is the risk involved in the operations of a business in other currencies. The value of an investment will be affected by changes in exchange rates. For instance, if a country's currency must be converted into a different currency to make an investment, changes in the value of the currency relative to the domestic monetary unit will affect the total gain or loss on the investment.

Manuel, (2008:6), is of the opinion that due to the continuing international move towards globalization, the value of the South African Rand becomes more dependent on the trade of raw materials and portfolio investment flowing from the rest of the world. It is therefore important to have a better understanding of the factors that influence a country's currency, and to foresee the potential fluctuations in a currency's value. Thus, the exchange rate risk involved in international transactions should be studied. Hedging strategies and analytical models may be used to predict and hedge the exchange rate risk, and may be an efficient tool for corporations in the evaluation and planning of the proposed projects.

Eichengreen (2006:1) mentions that, at present, the value of the Rand is more vulnerable, since most of the exchange rate controls have been abolished and the South African Rand free floats against the major currencies of the world. The problem is that there could be more exchange rate risks to which trade or investment parties are exposed to and may endure for a long period. This is because there is often a considerable time lapse between signing a contract

and the conclusion of a transaction. In order to manage exchange rate risk regarding future trade and investment, it is necessary for companies to have a number of exchange rate risk management strategies in place to hedge and reduce the exchange rate risks.

In summary, it can be stated that the Rand exchange rates against the major currencies around the world is subject to a high level of risk when companies and individuals consider whether or not to trade and invest in South Africa. The reasons for the high risk will be considered in Chapter 5.

1.3 Objectives

One primary objective and four secondary objectives have been identified for this research study.

1.3.1 Primary Objective

The primary objective of this study is to analyze and gain an understanding of the economic factors flows that have a major impact on the volatility of exchange rates. Major economic indicators are taken into consideration when exporters, importers and investors make trade and investment decisions. Therefore, economic indicators have an impact on exchange rate movements.

This primary objective will be achieved through the analysis of the factors and reasons for exchange rate movements from the 1990's up to the present, in Chapter four. A number of exchange rate risk management strategies and analysis models to hedge and reduce these exchange rate risks will be given in Chapter five. These include: cross – currency coupon swap, exchange – traded currency hedging instruments; uncovered based Parity (UIP) and purchasing power parity (PPP). This is done through the research process with the supportive literature study in Chapter two on the development of exchange rate regimes and exchange rate theories discussed in Chapter three.

1.3.2 Secondary Objectives

The following four secondary objectives will support the attainment of the primary objectives.

- To obtain a brief understanding of the development of the international monetary regimes, and to gain insight into the South African exchange rate system in particular.

- To identify the exchange rate theories and macro-economic approaches which have an impact on exchange rate fluctuations.
- To understand how such factors as money supply, inflation, interest rates and South African GDP growth level will impact the investment and trade activities between South Africa and the developed countries.
- To analyze the definitions, types and accounting measures of exchange rate risks. In order to have an understanding on how companies can use the hedging and arbitrage strategies in the international trade and investment activities to reduce foreign exchange rate risks.

1.4 Demarcation of the Study

The study will focus on South Africa's exchange rate regimes, the major economic indicators in South Africa, the trade and investment performance with developed countries which have an influence on the movements of the Rand currency value against the major currencies in different periods since the 1990s. Therefore, it will not include other emerging market countries' exchange rate policy or trade performances.

The theoretical study will only focus on the exchange rate regimes and the factors which have a huge impact on the South African exchange rate or Rand volatilities.

1.5 Research Methodology

The methodology of the study may be categorised as: a literature survey and an empirical investigation.

1.5.1 Literature Study

A study has been undertaken of the relevant research sources. These sources have been studied, evaluated and compared.

A literature study has also been compiled on the relevant subject of study, to provide a better insight into the research problem and the necessary background in order to provide guidance on the empirical part of the study. The sources are the research reports that were completed by international and national institutions, such as the World Bank, the International Monetary Fund (IMF), the South African Reserve Bank (SARB) and the South Africa Revenue Service (SARS).

Secondary data sources are from many other agencies and institutions that publish official statistics in the original or an altered form, designed to facilitate investigation, interpretation and analysis. The Journal of International Money and Finance and research articles obtained from other academic databases were also utilised.

1.5.2 Empirical Investigation

Based on the overview of exchange rate regimes in Chapter two and the study of theories and models in Chapter three, some important information, figures and supporting data, such as export and import figures, capital inflows and outflows, and the nominal and effective exchange rate of the Rand over a number of years are gathered for an investigation of Rand volatility in Chapter four. Practical models and strategies for exchange rate risk management are introduced in Chapter five.

Chapter four investigates the factors that triggered exchange rate fluctuations during the various periods in South Africa. The study also covers the exchange rate policy background during the investigation periods, as well as other economic indicators having a large impact on South Africa's currency value. These include a country's terms of trade, inflation, interest rate, money supply and economic growth rate. How companies manage exchange rate risk will be studied in Chapter five.

1.6 Layout of the study

The main part of the study will be divided into six chapters, which are summarised below:

The first chapter will focus on the background and scope of the study. It will highlight the problem statement, research objectives and demarcation of the field study. The research methodology and the outline of each chapter will also be explained briefly.

Chapter two comprises the literature study. It includes the historical introduction of a number of different exchange rate systems, such as, the Gold Standard, the Bretton Woods System, European Monetary System (EMS) and the current international monetary system. The four phases of South African monetary systems and exchange policies are also studied. In the discussion on South Africa's current exchange rate system, questions are raised on topics such as whether inflation targeting framework is suitable for South Africa's present economic circumstances; and with the Rand volatility, would the managed floating exchange rate system work better to promote trade and investment?

In Chapter three a review is made of the exchange rate theories, including the definitions of the exchange rate and the price of a currency; the theories of exchange rate determination, such as the Purchasing Power Parity (PPP), Balance of Payment and asset approach to exchange rate determination; followed by the equilibrium exchange rate theories, including the Fundamental Equilibrium Exchange Rate (FEER) theory, the Desired Equilibrium Exchange Rate (DEER) and Natural Real Exchange Rate (NATREX); by the end of the chapter, the Mundell-Fleming Model is studied to emphasize the role of government monetary and fiscal policies on impacting exchange rate.

Chapter four will focus on the empirical investigations and a comparative study on how the foreign investment and trade with developed countries have an impact on the country's currency value. The country's economic indicators, such as current account deficit, inflation and interest rate changes, are referred to in the South Africa's exchange rate content. The factors which have an impact on the exchange rate volatilities will be analysed through the study of trade, investment and nominal and effective exchange rate changes over a number of years.

Exchange rate risk is one of many financial risks involved in international trade and investment. The definition and the measurement of the exchange rate risks will be discussed. A number of management strategies and analytical models such as natural hedges, futures and forwards, options, swaps, uncovered based approaches, purchasing power parity and Balassa-Samuelson approach will be introduced in Chapter five to hedge and reduce the exchange rate risk of South Africa when trading with developed countries.

Chapter six provides the summary of the research. In this chapter, a general summary will be made of the fluctuation of the exchange rate movements. Some recommendations will be introduced on how South African exporters, importers and investors can manage the potential currency risk involved in the trade between South Africa and the developed countries.

Chapter 2

An Overview of different Monetary and Exchange Rate Systems

2.1 Introduction

There is a close relationship between the international monetary system and the exchange rate systems of the major countries in the world. According to Chacholiades (1990:482), it is the common knowledge that the particular exchange rate system sets broad parameters for economic policy-making and behaviour. However, the international monetary system embraces more than the prevailing exchange rate systems. Indeed, there is even uniformity in this regard. With most countries today subscribing to a flexible exchange rate policy, the international monetary system has come to denote the total environment which facilitates the flow of trade-related payments and capital flow, the interaction of currencies, and the exchange of ideas and financial assistance at national and international level.

According to ITRISA (2007:128), it is particularly distinctive about the international monetary system that it lends its weight to a far greater number of international transactions than those covering simply payments for goods and services. The inflows and outflows of foreign exchange transactions from countries' trading activities are modest compared with those arising from international capital transactions. In addition, a growing number of sophisticated financial instruments and innovations in technology have been responsible for the speed with which capital transactions are currently performed and the virtual disappearance of restrictions in the financial world.

International monetary systems are classified according to the degree of flexibility to the foreign exchange rates. It includes the fixed exchange rate system, floating exchange rate system (free floating exchange rate system and managed floating exchange rate system), and the alternative exchange rate system. The above mentioned exchange rate systems will be discussed in section 2.2.4. The ability of currencies to float against each other is various and determined by their economic and trade capacities and respective government or intergovernmental arrangements. Therefore, the exchange rates of the major currencies between each other are used as the common measurement of the currency values.

International trade and finance is involved with the complexities of international money transactions. The currency value or exchange rate is determined within the milieu of an international monetary system. The risk-reducing effects of international trade and investment would be greater if it is not for the volatile exchange rates associated with the current floating

exchange rate regime. Lam (2003: 349) warns that, the floating exchange rates introduce an additional element of risk in international trade and investment.

In order to gain a further understanding on the exchange rate risks, the different exchange rate regimes will first explained in this chapter.

It is the purpose of this chapter to fully explain the South African environment in which the monetary and exchange rate systems operate. In order to do so, an historic overview on the development of the exchange rate system is given. The discussion begins with an overview of previous exchange rate regimes starting with the Gold Standard and its termination in the 1930s. The Bretton Woods system, initiated in 1944, which established the basic framework for the post-Second World War era, the European monetary system and the current international monetary systems as well as alternative exchange rate regimes that will also be discussed. The South African exchange rate system will also be introduced and compared to other systems. The four phases of exchange rate systems and the exchange control policy will be analysed.

2.2 Exchange Rate Systems

An exchange rate system plays a very important part in the economic activities of a country. Isard (1997:24) states that a country's exchange rate system is one of the important factors for the functioning of other economic policy measures, and especially has an impact on international trade policies.

Different exchange rate systems have been developed in an attempt to attain economic stability. A particular system does not always provide the best solutions at all times. As economic conditions change, a system that was considered to be a good system could all of sudden reveal flaws. Exchange rate systems have changed remarkably over time. From the fixed exchange rate system, implemented in the 1870s, moving to the Bretton Woods system which was terminated in 1970s. After, 1973, most of the major currencies were allowed to "float" to a certain degree. In the following discussion, each of the exchange systems will be explained briefly.

2.2.1 The Gold Standard

The history of the Gold Standard may be traced back to the nineteenth century. According to Salvatore (1998), the period of the Gold Standard was between the years 1880 to 1914. Chacholiades (1990) is however of the opinion that the gold standard was between 1870 and 1914. Nevertheless, the period from 1870 to 1914 is regarded as the most affluent period of the Gold Standard and is also referred to as the 'classical gold standard', where virtually no capital movements were made during this period.

Lindert and Pugel (1996:532) state that gold became a standard measure of wealth throughout the world and at about 1870. After the California gold rush in the nineteenth century, almost all the major economic powers of the day adopted the gold standard. The gold standard is an exchange rate system based on the value of gold. Under the gold standard, countries defined the value of their currencies in terms of gold. For instance, in 1914, the US Dollar was worth 0.05 standard ounces of gold, while the British pound was worth 0.25 standard ounces of gold. The pound was worth 4.86 times as much as the Dollar in terms of gold, making one pound worth US\$ 4.86. The gold standard therefore made provision, in principle, for a system of fixed exchange rates, since the exchange rates were fixed by gold value. In most countries, paper money was also freely convertible into gold at a fixed rate.

The Gold Standard which is no longer believed to be an acceptable exchange rate system, nevertheless had advantages. According to Hill (1999:296), the advantage of the gold standard was to bring about the equilibrium in countries' balance of payments by influencing price levels. For instance, if a country had a current account deficit, the value of imports exceeded that of exports, the individuals wishing to make further payments to foreign parties would have to convert their domestic currency into gold and ship the gold. The loss of gold would reduce the domestic money supply, which would have a contractionary effect. This effect could for instance be on the subsequent tightening of credit conditions, and the rising of interest rates would discourage spending, and the overall price level would drop. Lower domestic prices would, in turn, lead to more cost-efficient production and a reduction in imports because of the availability of cheaper, domestic alternatives. Over time, the current account deficit would be reduced.

Another advantage of the gold standard, pointed out by Chacholiades (1990:489), is that by stabilizing the exchange rates, the gold standard also reduced price uncertainty and risk, and was seen to positively influence international trade performance at the time. The gold standard worked well for the 50 years before the First World War. During this relatively trouble-free period, the adjustment mechanism appeared to work well. However, subsequent research has shown that the gold standard was effective only because it was not put to any significant test. No major trading nation experienced any serious balance of payments deficits and thus there was no need to bring about dramatic changes to domestic price levels.

In summary, the Gold standard used gold reserves and gold price as the medium whereby the country's balance of payments is managed. It was relatively sufficient during the period from 1870 to 1914. The advantages of the gold standard included the reducing of the exchange risks; and to adjust the overall the money supply in an economy through the tightening of the credit conditions and rising interest rate. It automatically stabilized the exchange rates among major countries in the world and had the positive

influences on the international trade and investment. However, it only functioned well up to the beginning of the First World War.

According to Salvatore (1999:680), with the outbreak of the First World War in 1914, the gold standard was abandoned. The reasons being: the shipping of gold had become a risky operation under the war conditions; and the larger trading nations had to use a sizeable proportion of their gold reserves to finance the War effort. In an attempt to conserve gold during the war period, currencies were no longer allowed to be freely converted into gold and central banks took control of gold reserves. Although after the War, countries put the effort to return to the gold standard, such as, to restore the countries' currency convertibility into gold. The system could not function efficiently after the war. The main problem was that, there was widespread disagreement among the countries on where currency values should be set in relation to each other.

2.2.2 The Bretton Woods System

As discussed above, the gold standard could not function well after the war. A new exchange rate system, to facilitate international trade and investment had to be found.

As reported by Island (1997:45), plans for a new international monetary system began to take shape during the Second World War. It was in hope of avoiding the international economic disorder after the First World War. The conference was held in Bretton Woods, New Hampshire in US by the United States, the United Kingdom, and 42 other countries. South Africa was also invited as one of the representative countries. The new international economic order – the Bretton Woods agreement was formally launched with the declaration of fixed exchange rate parties by 32 countries in December 1946.

According to Island (1997:45), the Bretton Woods agreement reflected a middle ground between the philosophies of *laissez faire* and interventionism. The negotiations sought to establish a political alliance between those parts of the political establishments that lobbied strongly for free trade and those that sought arrangements to foster full employment and economic stabilisation. One of the objectives was to reach an agreement that countries with depressed economies would not resort, as they had in the 1930s, to 'beggar-my-neighbour' devices such as import restrictions or competitive devaluations. The outcome was to manage a multilateral system that left individual countries with considerable policy autonomy but subjected their exchange rate practices and international trade and payments restrictions to international agreement.

Two new international organizations, as reported by ITRISA (2007:135), are the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (the World Bank, IBRD) were created at the Bretton Woods conference. The IMF was designed to promote international monetary cooperation, to keep exchange rate systems in order, and to provide

short-term financial assistance to meet temporary balance of payments needs. The World Bank was established to finance reconstruction and development.

The question can be asked if the Gold Standard was totally abandoned, or did the Bretton Wood System develop from the Gold Standard.

Chacholiades (1990:495) stated that gold was still assigned an important monetary role in the Bretton Woods System, although it was more indirectly. Gold was again given a fixed price but was expressed in US Dollars only. Other currencies fixed their values in terms of Dollars. For instance, one ounce of gold was valued at 35 US Dollars; one Dollar, in turn, was valued at 360 Japanese yen, and so on. In practice, this meant that the US Dollar was the only currency which was directly convertible into gold; other currencies were convertible into Dollars at a fixed rate.

According to Salvatore (1998:682), the reason for this arrangement was that the United States became the main financial area in the world since its production facilities had not been devastated by the war. It was therefore considered logical to peg the US dollar with gold by virtue of the economic power of the United States. The US Dollar became the status of the key reserve currency and a major substitute for gold. The Bretton Woods System was also known as the gold exchange standard because gold was the ultimate reserve, other currencies could directly or indirectly be exchanged for gold.

From the above discussion, it can be seen that the Bretton Woods System is to some extent the Gold Standard System, wearing a US Dollar coat. Since the Bretton Woods exchange system was in operation, most countries' official international reserve started to take the form of US Dollars. The Bretton Woods System functioned well for about the first 20 years, but when it faced a series of crises, the system's weakness began to expose. According to Eichengreen (1993), by the end of the 1950s, US liabilities to foreign monetary authorities had reached 10 billion Dollars and US gold sales to foreign countries amounted to 5.7 billion Dollars net during the period. The use of gold as the ultimate reserve also became problematical in the 1960s and 1970s. The main reason was that gold production was not keeping pace with the growth in international trade. By the year of 1972, the gold only contributed 30% of the international monetary reserve, compared with the gold contribution of 66% in 1959.

Van der Merwe (2003:1) explains that, in this period, with the rise in inflation and the worsening of the United States' foreign trade position, speculation attack rose in the foreign exchange market and caused the devaluation of the US Dollar. The US Dollar devaluation was also impacted by the United States

deficit trade figures in since 1945. In August 1971, President Nixon of the US suspended the convertibility of the US Dollar into gold and announced the country's intention to devalue the US Dollar.

With the US Dollar under speculative attack, the Bretton Woods system could not function well. The Bretton Woods system breakdown involved some interconnected processes: the rising inflation and the trade deficit of the United States; and the increasing production capacity of the global economy. These resulted in reducing the impact of the US economy within the Bretton Woods order (Lindert & Pugel, 1996:532). The international monetary system moved towards a new regime, based on the free movement of capital in order to maintain international transactions.

2.2.3 The European Monetary System (EMS)

The European community is relatively small in geographic terms. A lack of monetary stability in one country can have an adverse effect on the rest of the continent. When the Bretton Woods system failed, a need for a new system to stabilize the economy arose.

According to MacDonald (1999), European countries continued their efforts to coordinate their monetary policies and to prevent intra-European exchange rate fluctuations, after the breakdown of the Bretton Woods system. In March 1979, the European Community decided to put the EMS into operation. Members that participated in EMS included Germany, France, Italy, Belgium, Netherlands, Luxembourg, Denmark and Ireland. They decided to fix their mutual exchange rates within certain bands and let their currencies fluctuate against the US Dollar.

The main purpose of the EMS was to encourage monetary stability in Europe. According to Salvatore (1995:695), the EMS acted as a transitional step towards establishing the European Central Bank (ECB) and a common currency in 1994. By 1998, the ECB was established and was responsible for setting up a single monetary policy as well as interest rates for the adopting nation. At the beginning of 1999, 11 European countries: including Austria, Belgium, Finland, France, Germany, Italy, Ireland, Luxembourg, Netherlands, Portugal and Spain, adopted a single currency, the Euro. Derived from a basket of varying amounts of the currencies of the European Union (EU) nations, the European Currency Unit (ECU) was an accounting unit used to determine exchange rates among national currencies.

ITRISA (2007:195) explained that the European Union (EU) which covered by the thirteen EMU members is known as the Euro Zone. The other three pre-enlargement EU member countries, the United Kingdom, Sweden and

Denmark continue to remain outside the EMU because they are not certain how well the EU will work in the medium and long term. The EMU was an improvement to the previous two systems, but also did not provide the perfect solution.

The EMU was an improvement to the previous two systems, but also did not provide a perfect solution. According to Lindert & Pugel (1996:536), the main benefits of the EMU to its member countries are: eliminating the cost associated with exchanging one currency for another within EU members, the product prices should be more competitive, since the economic policies now being determined by an independent central bank greater price stability should be achieved. However, there are also potential drawbacks: with the advent of the EMU, national authorities of different countries may no longer resort to using economic measures, as interest and exchange rates are determined by the ECB, so EMU's economic policy does not cater to the specific needs of individual countries.

Lindert and Pugel (1996:536) state that the consolidated GDP of the 13 EMU members is roughly equal to that of the United States, but the EMU's current share of international trade is marginally bigger. The US Dollar is still the leading currency in the world, although it has weakened quite markedly in recent years and the Euro has overtaken some of its value. For example, since there is a huge amount of trade between South Africa and Germany, and the United Kingdom, the South African Rand value is not only under the influence of the US Dollar, but also follows the trend of the Euro.

In conclusion, the purpose of the European Monetary System was to establish a greater measure of monetary stability and balance of payments equilibrium in the European Community. The system also has an impact on other aspects of policy makings among EU members. The Euro also acted as a conversion of Dollar balances. Currently, with the US financial crisis and the economy slowing down, the US Dollar is experiencing depreciation pressure against other major currencies. On the other hand, the Euro become a more stable and popular currency in world trade.

2.2.4 The Current International Monetary System

The present international monetary system is very different from that of a few decades ago. ITRISA (2007:109) points out that, many old restrictions that used to be placed on currency and capital movements between countries have fallen away. Countries around the world are free to choose the exchange rate systems which are more suitable for their trade and investment situations.

It is difficult to choose a suitable exchange system. According to Pentecost (1993:4), when exchange rates move, the price and hence the volume and value of goods and financial assets are affected. Because of the pervasive influence of exchange rates on an economy, it is usually unwise to allow the value of the domestic currency to fluctuate in a completely unfettered manner. On the other hand, with an extremely restrictive central bank policy as far as exchange rates are concerned, it could stifle export performance and, ultimately, growth. Moderate intervention by the central bank with a view to ensuring relative exchange rate stability is widely considered to be the most sensible policy, for instance, by allowing freedom of movement in the value of the currency but only within certain parameters.

Island (1997:187) mentions that, most of the conceptual literature relating to the choice of exchange rate arrangements is cast in terms of a dichotomy between fixed and flexible exchange rates. In practice, however, systems of rigidly fixed or perfectly flexible rates are hardly ever observed. In the official classification by the IMF, exchange rate arrangements are divided into three broad categories: pegged or fixed arrangements, flexible arrangements and an in-between category of arrangements with limited flexibility. National choices reveal a lack of consensus in the world today.

The different types of exchange rate systems are discussed in the next section. In most cases, the choice of the exchange rate system reflects a country's economic development and financial stability level. The political system may also play a role. For instance, developed countries tend to have more liberated system than developing countries.

2.2.4.1 Floating Exchange Rate System

With a floating exchange rate system, the value of a currency is not fixed to the value of a commodity or the price of another currency. A floating exchange rate system is a truly free market system.

According to Dornbusch (2004:515), a floating exchange rate system is the system, where the price of the currency or exchange rate, is determined by market forces. In other words, a completely flexible or purely or freely floating exchange rate is the price of the currency determined exclusively by the underlying balance of supply and demand for the currencies involved, with no outside intervention. Copeland (1990:14) states that under such a system, the monetary authorities of the country do not play a key role to influence the currency price or the currency volume. Rather, the quantities traded and the exchange rates between the domestic currency and other currencies are determined mostly by forces of demand and supply.

With the formalisation of the flexible exchange rate system, IMF members met in Jamaica and agreed on the rules for the international monetary system that are presently in place. Hill (1999:301) reports that, the Jamaica meeting was to revise the IMF Articles of Agreement so that they reflect the new reality of floating exchange rates. The main elements agreed on, included abandoning gold as a reserve asset, the acceptance of floating exchange rates, and the increase of the total annual IMF quotas to US\$41 billion – the amount that member countries contributed to the IMF.

With the Jamaican conference an attitude of flexibility seemed to be present. Chacholiades (1990:455) mentions that, a key feature of the Jamaican conference was to agree that countries were free to choose the type of exchange rate system that best suited their own needs. Pegged and floating exchange rates were given equal status and countries were no longer obliged to maintain specific par values for their currencies. Countries were however, urged to practice domestic economic policies that would encourage economic and financial stability

Salvatore (1995:655) stated that the floating exchange rate systems may be divided into two groups: free floating exchange rate system and managed floating systems. Each is subsequently discussed below.

- Free-floating exchange rate system

Under the free-floating exchange rate system, central banks do not intervene in the foreign exchange market. According to Salvatore (1995:655), central banks will, rather allow supply and demand forces to determine the currency price, and the values of foreign exchange rates are freely determined in the market.

The advantage of this system is that free market principles are allowed to determine the exchange rate. It is explained by Salvatore (1995:655) as follows: the perceived advantage of this system is that, any surplus or deficit in the balance of payments is automatically corrected, it saves the administrative costs associated with intervention. For example, a country experiences a decline in export sales during a particular period which is reflected as a current account deficit. The decline in exports is accompanied by reduced demand for, and thus a weakening in the country's currency. The weaker currency, however, makes exports cheaper and this fuels export performance once again. The weaker currency also makes imports more expensive. The improved export performance counteracts the weaker import performance and the currency achieves a break even. As the balance of payments essentially becomes self-adjusting, countries do not need to keep large stocks of foreign reserves in order to defend their domestic currency.

The free floating exchange rate system also has disadvantages which makes it a riskier system. Exchange rates become unpredictable and continuously fluctuate. Salvatore (1995:655) warns that, as exchange rates fluctuate on a daily basis, a potential foreign investor cannot predict the future value of the asset with any certainty, and the intended profits could easily turn into losses. As the exchange rate is allowed to surge or fall to any level, there could be dire consequences for the economy. If an exchange rate depreciates, imports become increasingly expensive and inflation soars to damage the economy.

With a free floating exchange rate system, it is not only worldwide economic performance that influences the exchange rates fluctuation, but also the actions of speculators.

Currently, South Africa has a free floating exchange rate system. The South African Reserve Bank does not use foreign exchange reserves or monetary policy tools to directly intervene in the foreign exchange market. The Rand is free floating against all the major currencies. Taking the above mentioned disadvantages into account, it is recommended that, as a developing country, in order to protect export industries, the South African government should act as an important player in the foreign exchange market in order to protect the growing economy.

- Managed floating exchange system

With a managed floating exchange rate system, the government or central bank sometimes enters the foreign exchange market as a participant in an attempt to manipulate currency value in different levels. Currently, this system is applied by most developed countries and almost all the developing countries in the world.

Colander and Gamber (2002:48) emphasize that under the managed floating exchange rate system; the government sometimes buys and sells its currency to influence the exchange rate but otherwise lets the market determine its value. For countries with a managed floating exchange rate system, the monetary authorities are able to smooth out short-term fluctuations while the underlying adjustment process takes effect. This system allows interference by the monetary authorities when they notice that current exchange rate movements will affect other economic measures, such as employment, inflation, and international competitiveness.

The managed floating exchange rate system can provide some order in an otherwise chaotic market. It lends itself to the possibility of making corrections within a relative short period. According to Dornbusch *et al.* (2004:505), this exchange rate system is also a guide to the underlying strengths or

weaknesses of an economy and a tool to correct temporary imbalances in an economy. The meaning of the managed floating exchange system may differ in different countries and different time periods. The effectiveness of the managed floating exchange system depends on the government's ability to manage foreign currency reserves; its ability to distinguish between reversible short-term influences and more fundamental factors; and the extent to which the government is prepared to use monetary policy to influence the exchange rate rather than to pursue domestic policies, such as the control of inflation and interest rates.

Edward (1999) explains that, the free floating and fixed exchange rate regimes are only two of the possible exchange regimes that a country can choose. It highly depends on the country's economic circumstances, which may be suitable for different systems. In practice, neither the floating nor fixed exchange rate system in its pure form is in evidence today. Today's international monetary system makes provision for a number of different exchange rate arrangements. The industrialised countries as well as some of large developing countries operate under a managed floating exchange rate system rather than the free floating exchange rate system.

In summary, the managed floating exchange rate system allows governments to keep the country's macro-economic stable and correct temporary imbalances in the market. It is the most popular exchange rate system applied by the developed or industrialized countries in the world. It is commonly understood that countries would normally first focus on domestic economic stability and then following with a suitable exchange rate system to assist further economic growth.

2.2.4.2 Alternative Exchange Rate Regimes

If the free floating exchange rate system and the fixed exchange rate system are taken as the two extremes, many other systems having some of the attributes of the two systems may be adopted to suit specific needs.

According to Edwards (1999), there are many layers between floating exchange rate systems and fixed exchange rate systems. Since neither free floating nor fixed exchange rate systems could eliminate all the problems raised by the modern-day globalising of financial markets. Countries around the world tend to choose the most suitable exchange rate system to their economic growth and development.

There are a number of alternative exchange rates systems, including floating within a band; sliding band; crawling band; crawling peg; adjustable peg; currency board; and full Polarization (moving between extremes); ranked

according to the degree of flexibility that they import into the economy and the relative stability they afford to the nominal exchange rate. For more reading on these different exchange rate regimes refer to Salvatore (1995), Edwards and Frankel (1999). In this section, some examples for the countries using the alternative exchange rate system will be studied.

Eichengreen (2006:1) reports that, a number of Caribbean islands peg their currencies to the US Dollar, while Cameroon and Comoros peg their currencies to the Euro. Most Asian countries' currency used to peg to American Dollar, which, in turn, floats against other currencies. With a view to achieving even greater exchange rate stability, a number of developing countries, such as China, proposed to peg their currencies to the Special Drawing Right (SDR) basket which is a basket of major currencies established by the IMF. The SDR basket is generally seen to be more stable than a single foreign currency because should the basket currencies depreciate or appreciate against one another, the SDR value itself will reflect the average of such currency movement.

The reason for the developing countries to choose an alternative exchange rate system is that, the key (major) currencies that are widely traded on the international trade market, have demonstrated relatively stable values over time, and it has become widely accepted as a means for international settlement. In many cases, the decision to link a currency to the US Dollar, Euro or other major currencies are based on the fact that the country concerned relies heavily with the United States or Europe for trade and investment.

According to ITRISA (2007:115), the main benefits of the alternative exchange rate system tend to be in the area of price stabilisation. With the domestic currency being pegged to the major currencies, the volatility in exchange rates is minimized. Exporting and importing therefore carry less financial risk. Inflation is often also brought under control because with a relatively stable exchange rate, the prices of importers remain stable and pressure on domestic prices is not too severe. However, the country concerned needs to be able to defend its currency against other key currencies. The monetary authorities cannot allow depreciation of the currency in order to stimulate exports. If the currency were seriously overvalued, the country would have to consider devaluation.

It has been indicated that the alternative exchange rate regimes are more suitable for the developing countries or emerging market countries. The reasons are: firstly a stable currency will attract more foreign investment, such as FDI for economic growth; secondly, protecting the growing manufacturing industries and financial markets with less volatile exchange rates and give all

the sectors time to be more competitive in an economy; thirdly, the requirement of a relatively high foreign exchange reserve will make the country less vulnerable to global financial crises from the rest of the world and thereby protect its own currency.

With a clear understanding of the differences among the free floating exchange rate system, the managed floating exchange rate system and alternative exchange rate regimes, the South African situation can be examined. In the next section, the monetary and exchange rate regime development in South Africa will be discussed in detail. Van der Merwe (2003) divided South African's monetary policies and exchange rate regimes into four different phases.

2.3 Monetary and Exchange Rate Systems in South Africa

In this section, the four phases of South African exchange rate systems will be discussed.

South Africa, as the world's major raw material producer, has a long history of exchange rate systems. Apart from being part of the global exchange rate system, it also had its own unique systems.

Aron *et al.* (1997:2) states that after being part of both the Gold Standard and the Bretton Woods era, South Africa experienced major shocks during the period 1970 to 1995. These shocks included significant gold price changes and political crises that led to capital outflows and intensified trade sanctions. These shocks complicated the exchange rate management and blurred the objectives of macroeconomic policies which were aimed at different objectives at different times, for example, monetary and exchange rate policies, the focus was switched between the BOP and anti-inflation stance in South Africa

Aron *et al.* (1997:5), also mentions that, in the same period, South Africa had current account deficits, which was successfully financed by capital inflows. It was followed by periods of current account surplus, caused by capital outflows. These changes largely reflected political developments, which had an important impact on the country's trade and investment flows and its adjustment process. Capital account deficits were experienced in the aftermath of the Sharpeville slaughter, the Soweto riots of 1976, and the long lasting period of political unrest beginning in the second half of 1984. Since the determination of the Bretton Woods system, the South African Reserve Bank (SARB) has operated different monetary and exchange rate policy regimes from 1970 to 2000. It is very important to have a common understanding about the reasons and impacts of the monetary and exchange policies in different phases.

According to van der Merwe (2003), South Africa has experienced four distinct phases of exchange rates and monetary arrangements in this period. It also included a considerable degree of financial and external liberalization, which included both trade reforms and capital control liberalization. In the following discussion, the four phases will be studied in detail.

2.3.1 The First Phase

The first phase according to Jonsson (2001:244) was about direct monetary controls and the desire to maintain the stability in the exchange rate of the Rand. In this period, South Africa's exchange rate policy mirrored volatile developments on the international front. Between 1970 and 1979, the Rand was pegged to either the U.S Dollar or the Pound Sterling. Frequent adjustments were made to the level of the peg in the form of discrete step changes. The exchange controls severely restricted the capital flows of residents, and the control measures were also applied relevant to both transactions by residents and to the repatriation of foreign investments. The first phase, however, was unsuccessful in terms of price stability, BOP equilibrium, and economic growth.

Van der Merve (2003) mentioned that, in this period, the SARB was forced to adjust the country's exchange regime by devaluing the Rand and pegged it to the US Dollar. This was because the relatively undeveloped domestic market, in foreign exchange did not permit a floating exchange rate, and most of the foreign transactions were denominated in US Dollars. In June 1972, the Rand linked to the Pound Sterling because the value of the Pound Sterling fell against stronger currencies. South Africa saw an opportunity to maintain a recovery in the BOP, but unfortunately it did not last long because only four months later the Rand was pegged once again to the US Dollar as the continued downfall of Sterling was irreconcilable with domestic economic objectives.

Aron *et al.*, (1997:2) describes the situation in June 1974 as the adoption of an 'independent managed floating' policy to reveal the changes in South Africa's underlying BOP and domestic economic environment. According to Van der Merwe (2003:3), the frequent but small adjustments were made to the middle market rate of exchange with the US Dollar between June 1974 and June 1975. Following speculative pressures on the Rand, the SARB pegged the rate to the US Dollar once again in June 1975. Authorities announced that the Rand-US Dollar rate would be kept constant for longer periods and the adjustments were only allowed when it was considered to be crucial in terms of basic changes in either the domestic or international situation.

The overall management of the exchange rate had an adverse effect on the economy. It is noted by Jonsson (2001:244) that, the restrictive exchange control measures were applied to this exchange rate regime. It was relevant to both transactions by residents and the repatriation of foreign investment. In this case, the exchange controls severely restricted the capital flows of the residents, while non-residents had to follow the procedures from sales of South African assets in blocked Rand accounts, which could only be freely transferred overseas after five years. The other direct monetary controls were applied in addition to exchange control in order to maintain the parity of the Rand as well as low interest rates for mortgage bonds and agricultural loans. These controls included ceilings on bank credit to the private sector, deposit rate controls, import deposits and hire-purchase controls.

The comment made by van der Merwe (2003:6) indicates that, the first phase was unsuccessful in terms of the most economic measurements of indicators, such as, price stability, BOP equilibrium, economic and employment growth. It however initiated an investigation into the monetary system and led to success findings by The Commission of Inquiry into the Monetary System in South Africa; known as the De Kock Commission.

According to van der Merwe (2003:6), the De Kock Commission findings indicate the deficiencies in the monetary system including:

- The monetary system could not control the rates of increase of monetary aggregates sufficiently.
- The disintermediation and re-intermediation practices were being applied and it caused market variation in the velocity of movement of money.
- Interest rates were not allowed to adjust to appropriate higher levels in order to attain more moderated and stable growth in both bank credit extension and money application.
- Both spot and forward rates of the Rand were kept from adjusting to levels that would have contributed to the suitable level of monetary demand.
- Speculated capital outflows increased when the Rand moved with the US Dollar for long periods at a time. Domestic economic conditions were excluded because the Rand-US Dollar peg was changed occasionally.

The first phase was noted by active central bank intervention. As indicated above, it placed a restriction on the working of free market forces with negative economic consequences.

2.3.2 The Second Phase

During the second phase, an attempt was made to allow market forces to play a more active role in the currency value. The second phase hoped to overcome the deficiencies of the first phase.

Van der Merwe's (2003:6) comments as follow: on the second phase, it was after the implementation of the De Kock Commission, that a recommendation was made for a transition to a more market-oriented measures and money supply targets in the 1980s. A managed floating, but dual exchange rate system, namely the Commercial Rand and Financial Rand, was in place between 1979 and 1983. A relaxation and simplification of the exchange control was instigated. However, in 1985, when operation problems appeared, the authorities were forced to re-establish strict exchange control measures and to put a hold on repayments of foreign debt due to sanctions against the country.

The second phase was in place between 1979 and 1983. According to Jonsson (2001:244), it applied mainly to the exchange control over non-residents. Financial transactions by non-residents were valued at a discounted exchange rate, the 'Financial Rand mechanism', and the Commercial Rand exchange rate was used to measure the current account transactions. In February 1983, exchange control over non-residents was abolished and the Financial Rand disappeared, leaving South Africa with a unitary exchange rate system that lasted only for a short period. This was accompanied by the downscaling of liquid asset requirements, and dismantling of interest rate controls.

When South Africa declared a moratorium in the mid-1980s, a debt standstill was introduced in 1985. This decision caused a number of international banks refusing to roll over short-term loans to South Africa. The ensuing financial sanctions resulted in a debt standstill. Since no new loans were being granted and in the mean time, the previous debt needed to be repaid in terms of the debt rescheduling agreements, the 1985 crisis became more severe than previous crises. At the time of the debt crisis, the situation was exacerbated by the fact that approximately 72 percent of South Africa's debt, standing at 42 percent of GDP, was short-term in nature. This led to the reintroduction of the Financial Rand, which once again led to a dual exchange system where capital controls were effectively tightened. This system was operational for the rest of the 1980s (Aron *et al.*, 1997:5).

According to the content which is emphasised by Aron *et al* (1997:2), the Financial Rand system was based on exchange control rules and gave the Reserve Bank power to interfere in the market by changing the existed

exchange control rules. Although the SARB could directly interfere in the market by selling or purchasing Financial Rand, and manipulate the Financial Rand market, most transactions actually took place without interference from the SARB. The exchange rate of the Financial Rand was determined under reasonably free conditions and highly volatile.

The above discussion indicated that the second phase could accordingly not function well. Van der Merwe (2003:10) states that it was due to the flexibility in the exchange rate, together with the flexibility produced in the determination of interest rates. Dornbusch *et al* (2004:201) correctly point out that according to the exchange rate theory, neither interest rates nor exchange rates may be determined independently from the money supply or from each other. In addition, by the end of 1980s, South African authorities saw an opportunity to introduce formal monetary targets.

2.3.3 The Third Phase

The third phase is known for the targeting of economic factors, mainly inflation targeting. As will be explained later in this study, inflation is one of the major factors affecting exchange rates. It therefore follows that inflation targeting makes sense in exchange rate management. It is especially important if it is taken into account that South Africa was accepted back into the international community during this period.

According to Aron *et al.* (1997:5), monetary targeting was implemented in a period of decline in the gold and other commodities prices. During this period, the economic growth rate dropped to the lowest level, with the decreasing of the foreign reserves. Therefore, the BOP situation experienced severe damage, and budget demands increased. The proportion of shortage between borrowing and lending widened, and unemployment rose. All this left monetary and other policy measures to focus on demand management in the short term. In the mean time, droughts in the country, together with social unrest and labour strikes, made the overall outlook worsen. The international constraints on economic development through trade boycotts, the disinvestment campaign, and withdrawal of foreign loans from South Africa forced political changes.

The third phase coincided with political reform in South Africa. It is described by Jonsson (2001:244) as follow: in the 1990s, the third phase was applied, and it focused mainly on informal inflation targeting with a managed floating exchange rate regime. This policy was made due to the successful completion of social-political restructuring. South Africa was released from international sanctions because of the empowerment of the Government of National Unity in April 1994, and was reintroduced into the world financial system. After the

general elections in 1994, the new government intensified liberalisations, and gradually relaxing the exchange controls, and implied an informal inflation targeting and managed floating exchange rate system.

In the third phase, economic development became more comparable to South Africa's trading partners. According to Aron *et al.* (1997:3), the SARB's monetary policy focused on creating a healthy financial and economic environment in the long-term perspective. Since the monetary policy emphasised mainly on reducing inflation, the framework was described as an informal inflation-targeting framework. Although the SARB set the inflation target, the SARB did not specify the time period. The aim was to gradually bring the domestic inflation rate into line with the average inflation rate of the major trading partners and stimulated trade. It would avoid periodic disrupting adjustments in the Rand's exchange rate.

As discussed above, the informal inflation target focused more on inflation, but did not increase the transparency and accountability of the monetary policy. According to Van der Merwe (2003:16), it was different from the formal inflation targeting, where the growth of the money supply played a critical role on monetary policy decisions. Because the changes of the domestic and international environment, it soon appeared unwise to place too much reliance on money supply to guide the monetary policy. Due to the different operation methods of domestic and foreign banks and the easy financial access of domestic banks, it became difficult to control the money supply. Money supply targets were soon referred to as money supply guidelines, but because most guidelines were missed, it became obvious that control was not possible

The problem with the money supply control led to large increases in the money supply that occurred during the period of liberalising and reintegrating process of South Africa into international financial markets. During this period of income velocity, the inflation rate started to decline. Van der Merwe (2003:16) comments that, it was interesting to note that the rise in money supply did not have an impact on inflation. This contrast reaction led to an unstable relationship between money supply and inflation and limited the impact of the money targets in the economy.

Furthermore, the SARB intervened in both the spot and forward foreign exchange markets. It was mainly based on its own initiative and the purpose was to influence the supply and demand conditions in the domestic market and to smooth short-term fluctuations in the exchange rate. Van der Merwe (2003:16) indicates that, for this reason, the SARB had to reconsider about its monetary policy and switched to a more practical monetary policy framework by the end of the 1990s.

Although the SARB put a lot of effort to change the monetary policy, the informal inflation targeting and the managed floating exchange rate policies did not materially affect the exchange rate level. The exchange rate of the Rand was still determined mainly by market forces. According to Aron *et al.* (1997), with all the above active interventions, the market still experienced large fluctuations on the weighted average value of the Rand. The emerging market crisis, such as the Asian currency crisis in 1997, the Brazilian crisis in 1999, and the up coming currency crises among emerging market countries had negative effects on the value of the Rand.

2.3.4 The Fourth Phase

Since the third phase with its informal inflation targeting did not provide the desired results, the SARB implemented a formal inflation targeting and a floating exchange rate regime in February 2000.

The fourth phase is summarized by Van der Merwe (2003:18) as follow:

- An anchor/ultimate objective was provided for monetary policy decision-making.
- Better coordination was promoted between monetary and other policy measures.
- The formal inflation targeting framework was enabling to enhance the monetary policy transparency.
- Monetary policy was more focused and the clear rules and procedures of the system strengthen the accountability and governance of the central bank.

According to Van der Merwe (2003), the new monetary policy system was a result of the large fall in inflation during the 1990s. In 1998, the consumer price index (CPI) fell to 7 percent, and by 2002, the inflation target CPIX was set at an average rate of 3 to 6 percent. The reason why South Africa took on formal inflation targeting combined with a free floating exchange rate system was because the central bank could not specify a target for the Rand exchange rates to the major currencies in developed countries. The SARB decided to allow the market demand and supply forces to balance the value of the currency against the major currencies, such as US Dollar, British Pound. The SARB managed cautiously on the country's Balance of Payments to stabilise the Rand value, but did not participate in buying and selling foreign exchange reserves in the market to keep the exchange rate of the Rand at a specified level.

Although the formal inflation targeting with a floating exchange rate system has been generally accepted by now, there are still concerns regarding the effectiveness of the system in the South African environment. According to Van der Merwe (2003:37), the question arose as if it is wise to gradually reduce and liberalise exchange rate controls in the South African situation. The floating exchange rate regime is a major concern with its effect on the Rand volatility. Serious doubts also exist on the effectiveness of the inflation targeting in an emerging market economy such as South Africa. Inflation targeting is sometimes considered to be less appropriate for an emerging market.

South Africa took on formal inflation targeting combined with a flexible exchange rate and it seems to function well at this stage of the South African economy. However, as a developing country which highly relies on commodity exports and imports for most of the value added products, currency stability is required. The central bank should use economic policies to influence the movement range of the Rand against major currencies. In essence, the Rand had been impacted by the movement of both an emerging market economy and an industrialised economy, while also being the target of speculators.

2.3.4.1 Inflation Targeting

With inflation targeting, a particular inflation goal is set within a specific measure of inflation. According to Mohr (2005:114), under the inflation targeting policy, a specified definition such as Consumer Price Index (CPI), or as in the South African case, CPIX - the adoption of CPI excluding interest rates on mortgage bond for the metropolitan and other urban areas was chosen as the measurement. This index is used as the basis for inflation targeting and has become the most keenly watched economic indicator in South African economy. The advantage is that the inflation targeting extended to open and developing economy. However, there is still doubt.

According to Van der Merwe (2003:29), it seems less appropriate to apply it in emerging-market economies, since the inflation targeting policy has been adopted by most of the developed countries. The debate about the inflation targeting is based on the following arguments:

- Emerging market economies, like South Africa are, in general, relatively open and more sensitive to such elements as external shocks, which complicate the implementation of inflation targeting.
- Emerging markets are normally dependent on international capital flows, which have a marked impact on these economics.

- Emerging markets have a less-developed financial infrastructure
- Central banks in these economies do not have the self-sufficiency to apply an inflation targeting framework in a credible manner.

Despite these characteristics, the South African government and the Reserve Bank successfully introduced and applied the inflation targeting framework through sophisticated information and communication systems. It is set by both the government and the central bank as the coordinate policy measures.

Inflation targeting monetary policy is a strategic plan to manage medium and long term price level. The advantages of inflation targeting are pointed out by Mishkin (2000:3) as follows: inflation targeting has several advantages as a monetary policy medium-term strategy. Inflation targeting encourages the use of all available information to determine the best course for monetary policy. The framework also focuses political debate on what central banks can achieve through monetary policy in the long term which is controlling inflation rather than on things like lowering unemployment and stimulating growth, which central banks cannot achieve through monetary policy alone. The framework is also easily understood by the public as a result of regular communication and is, therefore, transparent.

The advantages of inflation targeting were also referred to by Bernanke *et al.* (1999: 26). It indicates that the two major advantages of inflation targeting are transparency and flexibility. Transparency gives clear and timely communication of policy objectives, plans, and tactics to the public. Transparency also enhances the public to understand this monetary policy, reduce uncertainty and strengthen the accountability of the central bank to the public and to government. The flexibility shows the ability of the central bank to react effectively to short-run macroeconomic developments within the broad constraints imposed by the inflation targeting framework.

2.3.4.2 South Africa's Current Exchange Rate System

After adopting the free floating exchange rate system with the inflation-targeting monetary policy framework, the South African Rand has experienced dramatic appreciation and depreciation in its exchange rates against the major currencies. According to Van der Merwe (2003:35), figures indicate that the normal effective exchange rate of the Rand decreased by 12.5 percent in 2000 and 34.5 percent in 2001, but increased again by 26 percent in 2002 and 19 percent in the first quarter of 2003.

In the same period, as reported by MacDonald and Ricci (2003:3), the real effective exchange rate in 2002 was 25 percent weaker than in 2001. It only

recovered in the later 2002. The reason for the recovery of the Rand could be related to government's sound macroeconomic policies, fairly high interest rates, the uncertainties about economic conditions in most of the advanced economies, and a general flow of funds to emerging market economies. These wide fluctuations in the exchange rate of the Rand complicated the decision-making process concerning monetary policy. Although South Africa is a small player in international trade, the sophisticated financial system makes the Rand a very popular currency among traders.

Based on the above reasons, the South African Rand is more volatile under the free floating system than the fixed exchange rate system. Van der Merwe, (2003:37) explained that, when it comes to the choice between general economic stability and exchange rate stability, SARB considered general economic stability to be more important. In order to achieve exchange rate stability, the government must try to apply more healthy macro and micro economic policy measures. Unfortunately, it is difficult to achieve this goal due to large movements of international capital flows from developed countries.

The fixed and floating exchange rate systems both have advantages and disadvantages. Van der Merwe (2003:37) explains the reasons why South African policy makers decided to stay with a flexible exchange rate system rather than a more stable fixed exchange rate system or managed floating exchange rate system:

- There is a risk for South African authorities to fail on sustaining a more fixed exchange rate system, since it costs massive reserves to peg the Rand to the US Dollar, Pound Sterling, and a basket of currencies.
- South Africa does not have all the factors required to accomplish and maintain a more fixed exchange rate system. These characteristics include: the openness of the trade environment to suit the fixed exchange rate system; the adequate levels of foreign exchange reserve to influence the market exchange rates effectively; the existing monetary and fiscal measures that could not cushion the fluctuations; a well-supervised and regulated financial system to avoid speculation attacks; a business cycle correlating closely with the currency fluctuation.
- With Dollarisation, a fixed exchange rate system could lose the monetary policy flexibility. It is difficult for the authorities of the country to determine interest rate levels. The interest rate levels will therefore be determined with reference to the levels of other countries, without taking domestic economic conditions into consideration. This might lead to unstable conditions in the domestic economy, reduced economic growth and employment creation.

Although the fixed exchange rate system is not suitable for the current economic situation in South Africa. With a floating exchange rate system, it is equally impossible to obtain exchange rate stability. The Rand could, however, be pegged to one foreign currency, such as the US Dollar, to which some other currencies may also be linked. The Rand could also be pegged to a basket of currencies, but would then float against all of them. Floating is unavoidable in one form or another in the present circumstances.

It is currently very difficult to keep the Rand stable, since the SARB's current monetary policy focuses on adjusting the Repo rate as the major monetary policy tool to curb inflation. This approach has a slight impact on the exchange rate (which is not very effective). The debate is that South Africa is not ready and does not have all the characters for a pure free floating exchange rate system, The government could use monetary and fiscal policies measures to reduce the volatilities of the Rand. A managed floating system is considered to be the better policy.

2.4 Conclusion

Exchange rates form an integral part of the international monetary systems. In this chapter, the Gold Standard, the Bretton Woods system, and the European Monetary System were discussed in detail. Government or intergovernmental arrangements play a vital role in the ability to manage the currencies to move against each other. The development of the exchange rate systems indicates that a changing environment necessitated a new framework for a floating exchange rate system.

The focus fell on the South African situation; the four phases of South Africa's exchange system were studied. It included all the challenges faced and the transformation that was made to the current flexible exchange rate system. South Africa moved from the first phase with direct monetary controls, having the objective of maintaining the stability in the exchange rate of the Rand to more market-oriented measures with money supply targets in the second phase. In the third phase, South Africa moved to the informal inflation targeting and managed floating exchange rate system.

In February 2000 it was announced that formal inflation targeting would also be adopted in South Africa as a monetary policy framework. Before this announcement "informal inflation targeting" was already applied by the South African Reserve Bank.

In this framework, developments in the monetary aggregates were still regarded as vital elements in the inflation process, but the Bank closely monitored developments in other financial and real indicators in reaching at decision on the appropriate level of short-term interest rates. However,

interest rate only has an impact on the domestic prices level and portfolio flows. As it was indicated above, exchange rate stability should also be a concern of the South African Reserve Bank since import and export prices are determined by the Rand value, which impacts the domestic prices level.

There is a general agreement that the monetary policy should be primarily concerned with the pursuit of price stability. However, they still differ on how this objective may be achieved most effectively. It is argued that, exchange rate stability is one of the most important factors to determine the price stability and economic stability. In the South African case; Rand value influences the product prices in the market. Especially items such as petrol and clothing which highly rely on import from other countries. Therefore, South African government should consider both inflation targeting and a managed floating exchange rate policy together, to secure price stability in the economy.

Currently, the country has adopted a formal inflation-targeting monetary policy framework and a floating exchange regime. While this chapter presented the environment in which this study takes place, the next chapter will focus on different exchange rate theories.

Chapter 3

Exchange Rate Theory

3.1 Introduction

As it has already been discussed in Chapter two, international monetary systems have experienced dramatic changes since the 1900s. Countries are free to choose more suitable exchange rate systems after the Second World War. This decision caused the present systems to be more liberal and a far cry from that of the early 1900s, when exchange rates as well as capital and trade flows were heavily regulated. However, just as free trade could create an imbalance in the world economy, the liberalisation of international monetary systems has also led to a destabilisation of the world economy in recent years.

The definition from Colander and Gamber (2002:46) states that, an exchange rate is the price at which one country's currency trades against another. It is determined by the prices of the international trade in goods and services, and the prices of international flows of assets. In a fixed exchange rate system, a government may buy and sell its own or other currencies to maintain its exchange rate at a constant level. In a partially flexible exchange rate system, the government sometimes buys and sells its currency to influence the exchange rate, but otherwise lets the market determine its value. In a flexible exchange system, the government does not interfere in the foreign exchange market and lets the market determine a currency value.

It is a common understanding that every country has its own currency and must decide what type of exchange rate system to maintain. In academic discussions, the decision is often posed as a choice between a fixed or flexible exchange rate. In reality, however, there are different varieties of fixed and flexible arrangements, providing a range of alternatives as detailed in section 2.2.4. The different exchange rate systems have different implications for the national authorities in foreign exchange markets. According to Island (1997:24), government authorities would consider: if the exchange rates should be fixed or fluctuated. How to manage a fixed exchange rate system and within what ranges the currency should be fixed. If it is a floating exchange rate system, how to manage the exchange rate volatility in terms of the trade and investment environment should be considered.

Short-term fluctuations in exchange rates seem to have little significance on the real exchange rate. Aron *et al.* (1997:1) believes that, in the short term, the movements of the foreign exchange rates tend to be inconsistent. However, on the medium to long-term, the existing basis forces or the

'fundamentals', push a currency exchange rate towards an equilibrium exchange rate. Therefore, the real exchange rate becomes an important relative price that signals intersectional growth in the long term, which will be used to evaluate the exchange rate fluctuation. The level of the real exchange rate, relative to an equilibrium real exchange rate level and its stability, has been shown to have an important influence on exports and private investment.

Theories on equilibrium exchange rates are needed as a standard to measure actual exchange rate changes. It focuses on different models for determining the exchange rate. Currently, many alternative approaches are available for evaluating whether or not a currency is misaligned. It is the objective of this chapter to research and discuss the basic theories and models, such as the PPP, Balance of Payments approach, Asset approach to exchange rate determination; and the equilibrium models, such as the FEER, the DEER, the NATREX and Mundell-Fleming Model will also be explained.

3.2 Exchange Rate

It is appropriate to consider what an exchange rate is, how it is defined and the meanings of different quoted rates. The differences between the nominal exchange rates, real exchange rates and the effective exchange rates are studied for further theoretical discussion purposes.

According to Lindert and Pugel (1996:321), for a country under a floating exchange rate system, the price of the currency appreciates or depreciates in relation to other currencies over time. For instance, when more South African Rand, is required to purchase one unit of another the US Dollar, the South African Rand has depreciated against the US Dollar, or the US Dollar has appreciated against the Rand. Because an exchange rate is a ratio between two currencies, exchange rate movements should always be interpreted with circumspection. At any given moment there are a host of different exchange rates and over a given period the Rand may appreciate against some currencies while depreciating against others.

Mohr (2005:147) emphasises that, it is also important to draw a distinction between spot and forward exchange rates. A spot exchange rate is the price for "immediate" exchange. A forward exchange rate is the price for an exchange that takes place in the future. For example, a three-month forward exchange buying rate for US Dollar quoted \$1 = R7,2648 in February means that the importer may ensure paying a rate of R7,2648 per Dollar for a fixed amount of Dollars on 1 May. In practice, the forward rate (which is determined by the spot rate and the interest rate differential between the two countries) is usually higher than (at a premium to) or lower than (at a discount to) the spot price. Forward exchange transactions provide importers and exporters with an

opportunity to cover themselves against the risk of future volatilities.

3.2.1 Real and Effective Exchange Rates

Colander and Gamber (2002:200) indicate that, the nominal exchange rate is the exchange rate quoted at any particular time in money terms. For analytical purposes, a real exchange rate is calculated by taking the inflation differentiation into account. For example, in the case of South Africa and the United States, the bilateral real exchange rate between the Rand and the US Dollar is determined by adjusting the nominal exchange rate to the ratio of South African prices to United States prices. The underlying principle is that a proportionally higher increase in the domestic prices of South African products relative to the domestic prices of United States products will affect the competitive position of the South African economy, if this differential price movement is not neutralised by a corresponding adjustment of the exchange rate between the two currencies.

A terminology has been developed to describe prices of a composite of goods in one country relative to other countries that takes into account both exchange rates and differing rates of inflation between countries into account. It is the real exchange rate. Mohr (2005:148) defines the real exchange rate as the nominal exchange rate adjusted with price-level differences among countries. When price levels in both countries change by the same proportion, a change in the nominal exchange rate is also a change in the real exchange rate. If however, the price level rises more quickly in one country compared with another, the change in the nominal exchange rate between two countries will differ from the change in the real exchange rate.

According to Colander and Gamber (2002:200), the real exchange rate of a domestic currency (price of domestic currency in terms of foreign currency) may be expressed as follow:

$$E_R = E \times P_{\text{domestic}} / P_{\text{foreign}}$$

Where:

- E = the nominal exchange rate of the dollar,
- E_R = the real exchange rate of the dollar,
- P_{domestic} = the U.S. price level,
- P_{foreign} = the foreign level.

As discussed above, if the prices of composite goods and services are identical in both countries, the real exchange rate equals the nominal exchange rate. The inflation level is very low or close to zero (Colander & Gamber, 2002:200).

Mohr (2005:150) further explains that, for the purpose of analysing a currency value, real exchange rates are more meaningful than nominal exchange rates, since the real exchange rates took inflation into consideration. However, analysts often wish to obtain a picture of the average movement of the Rand against the currencies of all the major trading partners, in order to assess the competitiveness of the country's trade. These currencies may be appreciating or depreciating against South African Rand. An overall measure of the Rand movement against major currencies is obtained by calculating the effective exchange rate.

An effective exchange rate is defined by Mohr (2005:150) as the weighted average rate which is derived by weighting the exchange rates between the Rand and other main currencies. The weights are determined according to the shares of different countries in South Africa's foreign trade. It measures the overall value of Rand against a basket of currencies. It is also known as the trade-weighted exchange rate. Since the different sets of weights may be applied to the price indices, it is possible to estimate a range of effective exchange rates. This rather complex exercise is conducted regularly by the South African Reserve Bank to estimate an effective rate and also the trend of the exchange rate. The results are published in the SARB Quarterly Bulletin.

The SARB Quarterly Bulletin also expresses the effective exchange rates in nominal and in real terms. According to Mohr (2005:150), the nominal exchange rates are used to obtain the nominal effective exchange rate, while the real effective exchange rate is measured by adjusting the nominal effective exchange rate with the effective foreign price ratio. The effective foreign price ratio is the trade-weighted ratio between South African prices and prices in the economies of the main trading partner. As mentioned earlier, different sets of prices may be used for different purposes. They are all used as tools to compare and determine the real value of a currency.

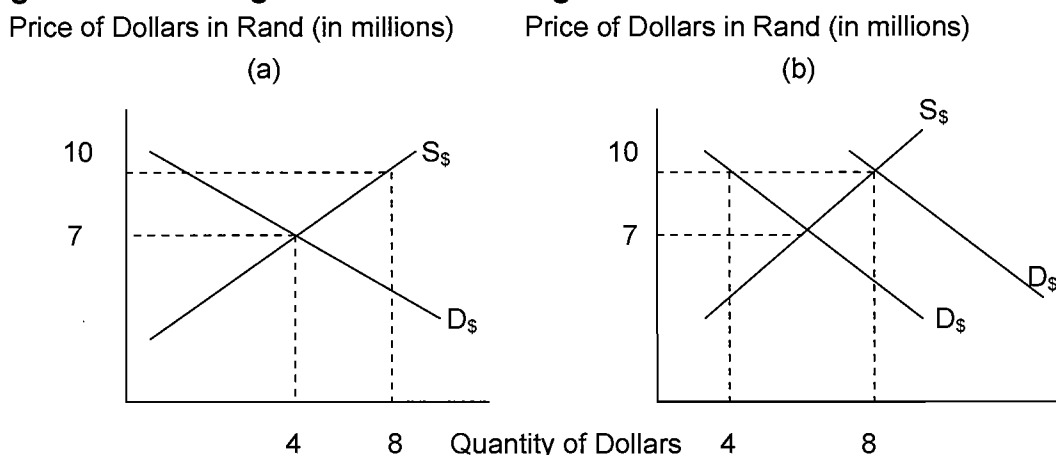
3.2.2 Price of a Currency

Colander and Gamber (2002:287) explained that, the key to understand what the factors that determine the 'price' of currencies, or the exchange rate are, is to see that market forces form the core that determine currency values.

The market forces of exchange rate determination are the demand and supply for the currency. According to Colander and Gamber (2002:287), a currency price follows the same rules as any product in the market. If the quantity of a currency's supply exceeds the quantity demanded, the currency's price in terms of the other currencies will fall. For example, if the supply of US Dollars exceeds the demand, the Dollars exchange rate might fall. If the quantity of a currency supplied is less than demanded, the currency price will rise.

Figure 3-1(a) below shows the demand and supply of US Dollars in terms of the South African Rand under a floating as well as a fixed exchange rate systems. To make the analysis simple, it assumes that only South Africa and the United States exchange currencies. It explains that under different exchange rate systems, how many Rand it will cost to buy one unit of the Dollar. Following this convention, the exchange rate in Figure 3-1 is the number of Rand it requires to buy one Dollar. The assumption states that at the equilibrium exchange rate, one would receive 7 Rand for every Dollar.

Figure 3-1 Floating and Fixed Exchange Rates



Source: Colander & Gamber, 2002:192

It can firstly be assumed that there is demand for US Dollars by South Africans. They demand US Dollars for two reasons:

- i. To pay for imported goods and services from the United States
- ii. To make investments in the United States

According to Colander and Gamber (2002:192), in figure 3-1 (a), the exchange rate is determined by the supply and demand for US Dollars; and it is the market forces that decide that the Rand to Dollar exchange rate is $\$1=R7$. Figure 3-1 (b) shows how a government must buy or sell its currency to keep its value at a legally set price that is different from the market-determined price. If the United States should want to fix the value of the Dollar at 10 Rand per Dollar, it would have to buy the excess supply of Dollars (\$4 million), using foreign exchange reserves. Alternatively, if the United States wants to fix the value of the Dollar at 7 Rand per Dollar, where excess demand is \$4 million, it would have to sell 4 million Dollars in exchange for Rand.

In other words, the demand for Dollars by South Africans is determined by the trade and investment demand for U.S. exports and assets. When the relative price of the US Dollar rises from $\$1=R7$ to $\$1=R10$, South Africans will have to give up three more Rand for every Dollar. The decline in value of the Rand will

increase the prices of U.S. goods and assets prices. Consequently, South Africans would demand fewer U.S. goods and assets and the demand should shift to the domestic products accordingly.

3.3 Exchange Rate Determination

As it has already been mentioned above, a currency value is determined by the market forces of supply and demand. To analyse the behaviour of the currency movements in the foreign exchange market, it is important to know what the factors that impact the market forces of demand and supply are.

Dornbusch *et al.* (2004:512) reported that, in any imbalanced foreign exchange market, the market forces will adjust the price and/or quantity of the currency demand and supply. The excess demand or supply will be corrected by the changes in exchange rates. There are three different methods that explicitly incorporate different views of the market forces on exchange rates: the Purchasing Power Parity theory (PPP), Balance of Payments approach which provide an overall picture of how trade and investments influence the exchange rates; and the asset approach with a focus on the portfolio flows and treats exchange rates the same as the prices of any other assets, impacted by the capital flow or investment movements in the global market.

3.3.1 Purchasing-Power Parity (PPP)

Purchasing Power Parity (PPP) is based on a 'no arbitrage argument' or 'law of one price'. PPP is a model of the 'inflation theory on exchange rates' against the balance of trade. According to Hoontrakual (1999:2), it is based on the principle that similar goods should cost the same in different countries. Since the PPP normally holds in the long run, the shifts in technology, consumer tastes, commercial policies or labour force growth will change national productivity and will permanently change the real exchange rate. Therefore, the PPP can be seen as a benchmark currency valuation.

The purchasing power parity (PPP) theory uses the long-term equilibrium exchange rate of two currencies to equalise their purchasing power. According to Krugman and Obstfeld (1997:401), this theory was developed by Gustav Cassel in 1920, and it is based on the law of one price. The theory states that in the efficient markets around the world, identical goods should only have one price. If the same item is traded at different prices, the exchange rates between two countries would tend to readjust themselves to reflect one price.

A PPP exchange rate equalises the purchasing power of different currencies in their home countries for a given basket of goods. It is often used to compare the standards of living between countries at market exchange rates.

If the cost of the product is not the same, the trade and investment will ensure purchasing in the cheaper country, and the trade flow will influence the demand for a currency, resulting in exchange rate fluctuations.

The PPP can also be used to measure the consistent deviations of the market exchange rates. Krugman & Obstfeld (1997:401) indicate that, when there is income differentiation in two countries, the prices of non-traded goods and services are usually lower where incomes are lower. For instance, a US Dollar exchanged and spent in India will buy more haircuts than a Dollar spent in the United States. Therefore, PPP also takes into account the level of the cost of living and adjusts for it as though all income is spent locally.

Jones and Kenen (1985:1004) assumed that, under the law of one price, the prices of the same basket of goods in Pounds in the UK, which is denoted as £P, times the spot exchange rate, indicated as \$/£ should equal the price of the same basket in the U.S. priced in Dollars, which is denoted as \$P.

$$\text{£P} (\$/\text{£}) = \$P$$

The equation implies that the exchange rate of two currencies equalise the value of a Dollar purchasing power. The PPP exchange rate therefore is:

$$(\$/\text{£}) = \$P/\text{£P}$$

Jones and Kenen (1985:1004) state that, in practice, if the actual spot rate is greater, then the Pound is over-valued against the Dollar. If the actual spot rate is lower, it suggests that the Dollar is over-valued against the Pound.

Mohr (2005:154) reflects that a very popular way to measure PPP is the Big Mac Index. The Big Mac index compares the price differentiations of a Big Mac burger in McDonald's restaurants in different countries. For instance, if a Big Mac burger costs US\$4 in the U.S. and GBP£3 in Britain, the PPP exchange rate would be £3 for \$4. The Big Mac Index is presumably useful because it is based on a well-known item. The final price, and it is easily tracked in many countries, includes input costs from a wide range of sectors in the local economy, such as agricultural commodities (beef, bread, lettuce, tomatoes), labour (blue and white collar), advertising, rent and real estate costs, transportation, etc.

In order to distinguish the above equation from other PPP theories, it is often called relative purchasing power parity. Colander and Gamber (2002:202) explains that it is used to predict the relationship between the two countries' relative inflation rates and the change in the exchange rate of their currencies. Relative PPP relates measures the inflation rates or the change of price levels in each country to the change in the market exchange rates.

Empirically, there is a lot of conflicting evidence regarding the PPP in the absolute or relative form, caused by statistical difficulties. Most of the evidence shows signs of large deviations from the PPP. The reason for the deviations is because it is difficult to find an accurate price index to measure the inflation. The result is that, PPP and inflation become less relevant in traditional macroeconomics including their ability to predict exchange rates. Pippenger (1986) claims the obstacle to finding empirical support for PPP may be due to the statistical procedures. The problem of simultaneous determination of both price and the foreign exchange rate results in errors. Hoontrakul (1999:8) states that, the studies indicate that PPP does not hold in each and every period, since adjustment time must be allowed for.

Pippenger (1993) concludes that relative PPP holds in the long run and the nominal foreign exchange rates follow a random walk. Meaning that there is no apparent fundamental reason for fluctuations. His research was based on monthly data since the 1920's through four episodes of floating exchange rates and three episodes of fixed exchange rates. Becketti, Hakkio and Joneis (1995) conclude that PPP holds in the long run. For that reason, Cassel, Dornbusch (1988) believes PPP remains a meaningful element of macro economics for an open economy, in order to measure over- or under valuation of a currency.

It should be noted that PPP is implicitly incorporated, through trade, demand and supply factors in the determination of exchange rates. For example, under PPP, if prices abroad are lower than at home, then domestic demand for foreign goods will increase and then the foreign currency will appreciate. Although there appears to be consistency problems with PPP over the short term, the research performed indicated merit for the use of PPP over longer terms. In the following section, the Balance of Payments approach will be explained, and it may be seen as encompassing the PPP approach.

3.3.2 Balance of Payments (BOP) Approach

The Balance of Payments approach for exchange rate determination takes trade and investment factors into consideration. Under the BOP approach, the domestic price of a foreign currency is determined in the same manner as the price of any other commodity. It is influenced by the intersection of the market demand and supply curves for that foreign currency. This section could also refer back to section 3.2.2, price determination of a currency under the fixed and flexible exchange rate systems. The BOP approach models are used to measure the demand and supply for foreign exchange as determined by the flows of currency created by international transactions.

According to Dornbusch *et al.*, (2004:514). the BOP theory of exchange rates believe that the supply and demand for a currency arise from the flows related to the BOP, that is, trade in goods and services, foreign direct investment and portfolio investment. Equilibrium exchange rates are determined when the Balance of Payments is in balance. Exchange rates tend to fluctuate in response to a BOP imbalance. For instance, if a country has a current account deficit, the currency tends to depreciate to restore the balance; when there is a current account surplus, the currency will normally appreciate.

3.3.2.1 The Balance of Payments (BOP)

The Balance of Payments approach tracks all the transactions crossing the borders of a country during a given period, usually a financial year. Imports and investments in foreign countries create a negative financial inflow or a positive financial outflow for the country concerned, whereas exports and foreign investment inflow create a positive financial inflow or negative financial outflow. According to Dornbusch *et al.*, (2004:514), the convention is to treat all financial inflows as a credit to the balance of payments, and all outflow as debit. A BOP is not an income statement or a balance sheet but rather a cash balance of the country relative to the rest of the world. As long as the country is not bankrupt, the balance of all financial flows must be equilibrated, like any cash balance. In other words, the final balance must be zero.

The following example mentioned by Dornbusch *et al.*, (2004:514), considers a country whose only international transaction in the year 2006 consists of a USD 10 million import. This operation creates a negative USD 10 million inflow to the country. The importer would liquidate foreign assets worth USD 10 million to pay for the transaction. This operation creates a USD 10 million outflow to the country. Thus, the net balance will be zero. The importer could also borrow USD 10 million abroad, creating a positive USD 10 million inflow to the country.

The BOP is usually divided in three parts: the current account (CA), the capital and financial account (KA), and the official reserve (OR) account:

$$\text{BOP} = \text{CA} + \text{KA} + \text{OR} = 0$$

According to Lindert (1991:325), the current account (CA) items on balance of payments, includes the balance on goods and services, income received or paid on existing investments, and unrequited transfers. Exports and income received from foreign countries appear as credits to the balance.

The capital and financial account (KA) indicates all short-term and long-term capital transactions. Lindert (1991:325) reports that, the items under KA

include direct investment, portfolio investment, other capital flows, net errors and omissions. Direct investment is the net amount of direct purchases of companies or real estate made by a resident abroad and by foreigners at home. The purchase of a foreign company by a resident is treated as a debit, as it corresponds to a financial outflow. The capital account covers all transactions that involve the receipt of payment of capital transfers and acquisition/disposal of non-produced, non-financial assets. The financial account covers all transaction associated with changes of ownership in the foreign financial assets and liabilities of an economy. Such changes include the creation and liquidation of claims on, or by, the rest of the world.

According to Lindert (1991:325), the Official Reserve (OR) account covers the transactions made by the central bank. The OR reflects net changes in the government's international reserve. For example, when the Federal Reserve Bank in United States sells foreign currencies, it will receive USD in exchange. This inflow of USD is treated as a credit to the BOP, *visa versa*. The OR has two components: first, it reflects the change of the central bank's holdings of foreign assets, and second, the OR reflects the change in the net borrowing position of the central bank from foreign banks.

There is also an item that reflects omitted and badly recorded transactions. This item is called Statistical Discrepancy (SD). As explained by Lindert (1991:328), the purpose of this item is to make sure the BOP could add up to zero. There are many reasons to justify this inequality: the recording of the payments and receipts arising from international transactions are done at different times and places or using different methods could cause error; the recording of some services and some financial transactions might not be reported with accuracy. The overall balance, or overall settlement balance, is equal to:

$$CA + KA + SD$$

Which by construction should be equal to -OR. The overall balance of payment is significant because it indicates a country's imbalance that should be accommodated with the government's official reserve transactions. The overall balance is a good indicator for investors to see the pressure that a country's currency faces for depreciation or appreciation (Lindert, 1991:329).

Under the BOP approach, there are a number of subsidiary approaches whereby the BOP approach can be implemented. These approaches will be discussed in the following sections.

3.3.2.2 The Balance of Trade as a Determinant of Exchange Rates

The BOP theory views exchange rates as determined in the free flow markets. The balance of trade approach simplifies the BOP approach in that the BOP is substituted with the Current Account (CA). According to Salvatore (2001:520), under this context, exchange rates will move to eliminate international trade imbalances. To simplify the theory, assume that the KA and OR are equal to zero. In this case, the BOP is equal to the CA. The current account is determined by the difference between exports (X) and imports (M). Both exports and imports are a function of the real exchange rate (Rt), domestic income (Yd) and foreign income (Yf). Therefore:

$$CA = X - M = f(Rt, Yd, Yf)$$

Where:

- X = exports, M is imports
- Rt = the real exchange rate
- Yd = the domestic income
- Yf = the foreign income

Salvatore (2001:520) states that: when real exchange rates are higher than the equilibrium level, it should expect more exports and fewer imports, and a current account surplus; while at lower real exchange rates, the opposite should occur. According to the balance of trade approach, the exchange rate moves in the required direction to compensate a trade imbalance. For example, suppose the trade balance is in equilibrium, $CA=0$. An increase in domestic income leads to an increase in demand for imports and therefore to a trade deficit ($CA<0$). Then, it should expect the exchange rate to depreciate to correct this imbalance resulting in an increase in domestic prices.

The balance of trade approach is used to estimate the trade elasticities with respect to changes in exchange rates. The elasticities are needed to measure the response of imports and exports to a change in exchange rates. The short-run and long-run elasticities are distinguished to calculate the elasticities (Lindert & Pugel, 1996:495). For example, because of forward contracts, in the short-run imports and exports are quite inelastic (insensitive) to changes in exchange rates. On the contrary, the balance of trade approach indicates that, the exchange rates are quite elastic in the long-run. Over time, however, it should expect this CA imbalance to be reversed. This over-time phenomenon of the CA is called the J-curve.

According to Salvatore (2001:520), the shortcoming of this approach is that exchange rates do not work in the simple way considered by the balance of trade approach. There have been many situations when countries with trade surpluses have depreciating currencies, while countries with trade deficits

have appreciating currencies. This phenomena indicates that there are other factors aside trade having impacts on exchange rates movements.

3.3.2.3 The Absorption Approach to the Balance of Trade

According to Sercu and Uppal (2001:521), the absorption approach to the balance of trade (CA) indicates how domestic spending on domestic goods changes relative to domestic output. That is, the CA is the difference between what the economy produces and what it consumes, or absorbs. Using basic macroeconomic identities, in equilibrium, it can be written as:

$$Y = C + I + G - T + (X - M)$$

Where:

- C = consumption,
- I = private investment,
- G = government spending and
- T = national taxes,
- (X-M) = net export

Absorption, A, is defined as the sum of C+I+G. If total output, Y, exceeds absorption A, then the nation will export more to the rest of the world and the current account surplus will increase. On the other hand, if absorption exceeds domestic output, import rises, the current account will fall.

The absorption approach mainly analyses the effect of devaluation on the trade balance. For example, if a government devalues its currency (under a fixed exchange rate system), the depreciation would tend to increase net exports, and domestic output will increase if the economy is not at the full employment level. If the economy is at the full employment level devaluation will only result in inflationary pressures. Rearranging terms in the previous equation:

$$CA = S - [I + (G - T)]$$

Where:

- S = after-tax private savings

The formula can be used to analyse how to reduce a CA deficit. To increase the CA, one of the following must happen: S should be increased, for a given level of I and (G-T); I must decline, for a given level of S and (G-T); The government deficit G-T must decline, for a given level of S and I.

The discussion on the various Balance of Payments approaches are mainly focused on the condition of the Balance of Payments equilibrium as the fundamental determinant of the equilibrium exchange rates. The BOP approach on exchange rate determination believes that the trade and

investment flows would influence the demand and supply relationships, and determine the exchange rates. The BOP approach to balance of trade is the simplified version of the BOP approach. It focuses on the domestic spending and output relationship to impact export demand, and further influence the exchange rates. The following section takes KA into account, and it will explain how the investment flow impacts on exchange rate volatility.

3.3.2.4 The Monetary Approach to the BOP

The BOP analysis as explained by Dornbusch *et al.* (2004:514) becomes more complex when the capital account is taken into consideration. When the official reserve account (OR) is small, the KA provides the other side of the CA. That is,

$$KA = -CA$$

It therefore follows, and is also pointed out by Dornbusch *et al.* (2004:514) that, a CA surplus equals a KA deficit. For example, in 1979, Kuwait was earning much more on its oil exports than it was spending on imports. Since it was earning more than it was spending, it was accumulating foreign IOUs, or financial assets, in the form of bank deposits in New York and other financial centres. By looking at the KA, if it is in a deficit, it indicates that the country is either accumulating debt or running down its current stock of foreign assets. If the CA is in surplus, then the country is either repaying debt or building up its stock of foreign assets.

It must be noted that the operation of the monetary approach differs under fixed exchange rates and flexible exchange rate systems. Salvatore (2001:515) explained that, under a fixed exchange rate system, the monetary approach to the BOP is very simple: When the central bank is supplying more money than what domestic residents demand, domestic prices increase. Since the exchange rates are fixed, the excess money supply leaves the country as capital outflows until domestic prices get to the level of the rest of the world. At that point, equilibrium is achieved again. On the other hand, when there is an money demand in the domestic country, assets prices rise to attract an inflow of capital. The international capital flows adjusts the monetary disequilibrium.

Salvatore (2001:520) mentions that, under a floating exchange rate system, when the KA includes the financial transactions associated with international trade as well as flows associated with Foreign Direct Investment (FDI) and portfolio flows involving the transactions of foreign stocks, bank deposits and bonds. If this is the case, the adjustment mechanism becomes more complicated. Since investors care more about returns on the home currency, interest rate differential impact the KA.

$$KA = f(i_d - i_f, S_t)$$

To see how the above equation works, suppose the BOP is in equilibrium. According to Salvatore (2001:520), it assumes that domestic interest rates increase relative to foreign interest rates, that is, i_d increases. Foreign and domestic investors will attempt to substitute foreign denominated assets by domestic denominated assets, which in turn lead to a capital inflow. Demand for domestic currency increases and therefore the domestic currency appreciates. This appreciation will bring the BOP back to equilibrium, since foreign assets and goods become cheaper than domestic assets and goods. That is, under flexible exchange rates, changes in the level of exchange rates adjust monetary disequilibrium.

According to Dornbusch *et al.* (2004:515), the monetary approach to the BOP incorporates international financial flows to the model. The monetary approach views any BOP disequilibrium as a monetary disequilibrium, which is manifested through the capital account. A detailed discussion on how the capital flow or investment have an impact on the exchange rate movement will be studied in section 3.3.3, PPP and Interest Rate Parity and 3.3.4, Portfolio approach on exchange rate fluctuation.

In summary, the Balance of Payments approach of exchange rate determination, as discussed in this section covered the aspects of the factors that impact the exchange rate movements, including: the trade flows from import and export activities to analyse the current account performance for import and export activities; and the capital flows to emphasise the capital account figure from the capital flow of a country. This theory is a further indication that a country's currency value is influenced by both international trade and investments.

3.3.3 Asset Approach to Exchange Rate Determination

Related to the view that a currency is a commodity, it follows that a currency may also be seen as an asset. An asset is defined in all accounting text books as a resource, controlled by an enterprise with future economic benefits. Currencies therefore fall into the definition of an asset.

When the currency is assumed to be an asset, an interest parity condition, like PPP, follows the essence of international manifestations of the law of one price. According to Lindert and Pugel (1996:380), in the absence of friction, the US Dollar rate of return on security investments, or the US Dollar costs of borrowing, will be equal in different countries where there is perfect capital mobility and perfect capital substitutability. Thus, as illustrated in Figure 3.2, interest parity, exchange rates and inflation rates are interdependent.

Lindert and Pugel (1996:380) reports on the history of the asset approach as follows: In the 1970s, the view of a short-term behaviour of exchange rates as determined by the flows associated with international trade was challenged. However, one could think that currencies are the same as other assets. In this view, exchange rates are asset prices that adjust to equilibrate international trade in financial assets. Exchange rates are relative prices between two currencies and these relative prices are determined by the desire of residents to hold domestic and foreign financial assets. As with other asset prices, exchange rates are determined by future expectations. This approach, which treats currencies as assets, is appropriately called the asset approach.

3.3.3.1 Monetary Approach Model

The development of the monetary approach is based on the asset approach theory; it is used to understand the long-term movement of exchange rates. The monetary approach is the one variant of the asset approach.

The asset approach, according to Lindert & Pugel (1996:373), assumes a high degree of capital mobility under the free floating exchange rate systems among countries. The difficult part of this approach is to specify the domestic and foreign assets to be included in the portfolio of a domestic resident. Since exchange rates are relative prices between two currencies, a simple model is to consider domestic money and foreign money. This simple asset model is called the monetary approach model.

The Monetary Approach focuses on the supply and demand of money and the money supply process. The monetary approach hypothesises that the Balance of Payments and exchange-rate movements result from changes in money supply and demand in the market transactions.

According to Lindert & Pugel (1996:373), the traditional monetary approach is based on the Quantitative Theory of Money (QTM) and Purchasing Power Parity theories.

Colander and Gamber (2002:183) refers the Quantitative Theory of Money (QTM) stated as:

$$M_s V = P Y$$

Where:

V = the velocity of money,

P = the price level,

Y = real output and

M_s = the supply for money, which is equal to money demand.

In Lindert and Pugel (1996:373)'s explanation, it is assumed that the currency

prices are fully flexible, that is if the money supply, MS, decreases or increases then prices will adjust instantaneously. Using the subscripts d and f to denote domestic and foreign quantities, then after simple substitutions, the spot rate is determined by:

$$S_t = (V_d/V_f) \times (Y_f/Y_d) \times (M_{sd}/M_{sf})$$

Equation $S_t = (V_d/V_f) \times (Y_f/Y_d) \times (M_{sd}/M_{sf})$ assumes not only fully flexible prices, but also that PPP holds continuously.

Assuming V is constant in the short-run and after some algebra, it obtains:

$$s_{t+T} = y_{f,T} - y_{d,T} + m_{sd,T} - m_{sf,T}$$

Where small letters represent percent changes (growth rates) in the underlying variables. The More Sophisticated Monetary Approach Model will model the demand for real-money holdings, LD, which in equilibrium is equal to MS/P, that is,

$$M_s/P = L_D$$

Now, in the model, LD is a function of income, Y, and interest rates, i. For example,

$$L_D = k Y^a e^{b i},$$

Where:

k represents the inverse of velocity of money, V.

After the substitutions and using PPP, it obtains:

$$\ln(S_T) = a[\ln(Y_{f,T}) - \ln(Y_{d,T})] + b(i_{f,T} - i_{d,T}) + [\ln(k_f) - \ln(k_s)] + [\ln(M_{sd,T}) - \ln(M_{sf,T})]$$

Note that the interest rate differential now plays a role in the determination of exchange rates. Recall that the interest rate differential provides information about the expected change in exchange rates, $\{E (S_{t+T})/S_{t-1}\}$. That is, the present exchange rate depends on expectations about the expected exchange rate for the next period. Through several substitutions, it is easy to see that the exchange rate today depends on the expected path of future exchange rates.

The monetary approach presented above has very precise implications. It predicts that the spot rate behaves like any other speculative asset price; the value of the spot rate changes whenever relevant information is released. For the simple monetary model, relevant information includes changes in the domestic and foreign money markets factors, such as the Balance of Payment performance figures; the inflation rate fluctuations; interest rate movements

and changes in domestic and foreign output (GDP). As with any other asset, the investors' expectations about the future value of the relevant variables plays a major role in the determination of exchange rates.

3.3.3.2 Portfolio Approach

The portfolio approach indicates that the exchange rate fluctuation is impacted by the portfolio return. According to Salvatore (2001:529), the portfolio approach postulates that the value of a nation's currency is determined by quantities of these assets supplied and the quantities demanded. In contrast to the monetary approach, other financial assets are as important as domestic money.

It assumes that individuals earn interest on the securities they hold, but not on money. It also assumes that households have no incentive to hold the foreign currency, hence, wealth (W), is distributed across money (M) holdings, domestic bonds (B), and foreign bonds (B*) (Salvatore, 2001:530).

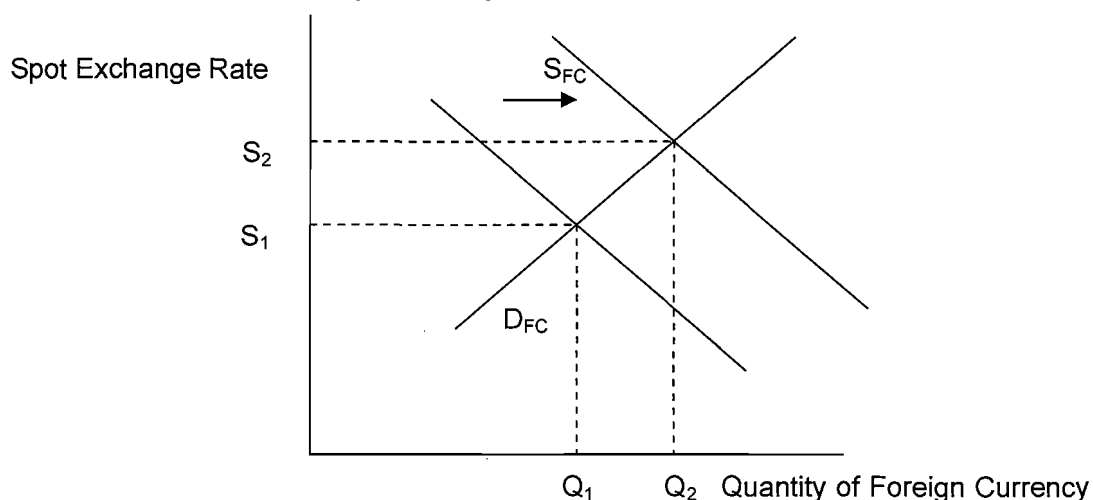
A domestic household's stock of wealth is valued in the domestic currency. Given a spot exchange rate, S, expressed as domestic currency units relative to foreign currency units, a wealth identity may be expressed as:

$$W \equiv M + B + SB^*$$

The portfolio approach postulates that the value of a nation's currency is determined by quantities of these assets supplied and the quantities demanded. In contrast to the monetary approach, other financial assets are as important as domestic money.

Figure 3-2 The Portfolio Approach to Exchange Rate Determination

Domestic Currency units/Foreign currency units



Source: Salvatore, 2001:213

Figure 3-2 according to Salvatore (201:213), indicates that the domestic monetary authorities increase the monetary base through an open market purchase of domestic securities. As the domestic money supply increases, the domestic interest rate falls. With a lower interest, households are no longer satisfied with their portfolio allocation. The demand for domestic bonds falls and households shift out of domestic bonds. They substitute into domestic money and foreign bonds. Because of the increase in demand for foreign bonds, the demand for foreign currency rises. With everything else constant, the increased demand for foreign currency causes the domestic currency to depreciate.

The monetary approach model to exchange rate determination, emphasises that the exchange rates are determined as the relative price of money in the short term. More emphasis is placed on the short term capital flows rather than the trade balance. On the other hand, the portfolio approach believes that the value of a nation's currency is determined by quantities of all the financial assets supplied and the quantities demanded. In the portfolio approach, the interest rate differences play a very important role to attract investment flows that lead to currency appreciation. A country that offers a higher interest rate could attract more foreign investments.

3.4 Equilibrium Exchange Rate Theory

In a perfect world having efficient markets, exchange rates should find a comfort zone and remain in equilibrium. The real world is, however, characterized by chaotic systems, and exchange rate movements often appear chaotic. The purpose of this section is to explain how the exchange rate fluctuations are impacted by the imbalance of the macro-economic fundamentals, such as inflation, interest rates and current account performance.

Aron *et al* (1997:1) states that, exchange rate movements appear to be inconsistent in the short term. When focusing on the medium to long term, it is believed that existing basic forces, called 'fundamentals', push a currency's exchange rate towards an equilibrium exchange rate. The real exchange rate is an important relative price that signals inter-sector growth in the long term. The level of the real exchange rate, relative to an equilibrium real exchange level and its stability, has been proved to have an important influence on trade and investment flows. Under equilibrium exchange rate theory, there are a number of models which will be discussed.

3.4.1 Fundamental Equilibrium Exchange Rate (FEER)

The Fundamental Equilibrium Exchange Rate (FEER) is when the real

exchange rate achieves both internal and external equilibrium and balance over the medium-term. The model operates under the assumption that it is in an open economy in which capital is perfectly mobile.

According to Williamson (2003), this model is suitable for the interpretation of equilibrium on short-term imbalanced countries. A country can experience a period of short-term imbalances, to catch up with the developed world without losing the medium-term external balance. The FEER takes all the macro economic fundamentals into consideration, and focuses on the impact of the various changes in economic indicators on the exchange rate movements.

John Williamson introduced the concept of FEER in 1985. Williamson (2003) established the term “fundamental equilibrium exchange rate” to explain what a country’s exchange rate should be. The FEER moves the focus away from analysing only momentary market equilibrium to a broader macro-economic fundamental equilibrium. An overvalued exchange rate would imply deflation in the economy or an untenable payment deficit. The opposite also applies for undervalued exchange rates. Clearly a fundamental equilibrium holds where neither of these undesirable outcomes exists.

Williamson (2003) explains that, the brief examination of a country’s macro-economic situation would be able to drawn a tentative conclusion on whether the country’s exchange rate is overvalued or undervalued. A currency is under valued when the economy of the country is overheating and experiences a larger current account surplus than is needed to sustain its BOP position for the foreseeable future. On the other hand, if the economy suffers from underemployment and a loss of foreign exchange reserves, which is caused by a current account deficit and the deficit, can not be financed by the sustainable inflows, the currency is overvalued.

However, the actual situation is more complex when different economic indicators point in different directions. Williamson (2003) states that, in the case of when the economy of a country is overheating, but the country has an unsustainable BOP deficit, the question arises as to what would happen if excess demand had been eliminated. The situation could be that the elimination of excess demand pressure improves the BOP, and the currency is not overvalued. The FEER model suggests that, when the economy has reached an internal balance, the BOP position might be in an unsustainable surplus. The FEER model will be discussed in detail in the next section.

3.4.1.1 The FEER Model

According to (Williamson, 1994:179), FEER is associated with the underlying balances of all the economic forces in the market. The equilibrium exchange

rate is consistent with the ideal macro-economic balances, and will change gradually over time when the balance shifts. Both the internal balance and the external balance are normative elements. The internal balance implies the recognition of historical wage rates and with given controlled inflation, an effective demand that may achieve the highest level of economic activity. The external balance is normally defined in terms of a current account target, with the minimum criterion being the sustainability of the BOP.

Akram *et al.*, (2003) explains that the Fundamental Equilibrium Exchange Rate model structure is as follows: Once the currency of a country is recognised as being misaligned, the degree of misalignment must be determined by using a quantitative macro-econometric model which might be basic or even implicit. The model needed is one that may explain current account outcomes with a measure of economic activity and the real exchange rate. This allows the calculation of the real exchange rate. This is the rate that is needed to obtain a targeted current account with a normal and sustainable level of activity. The change in the nominal exchange rate must be estimated to achieve the desired change in the real exchange rate.

According to Black (1994:280), a FEER may be calculated either on an ex ante basis, anticipating a path to future internal and external balance, or an ex post basis, since the exchange rates are consistent with internal and external balance. The purpose of a FEER is to establish a benchmark against which misalignments are measured in market exchange rates. These misalignments are due to such temporary factors such as deviations from internal balances, trade restrictions, and abnormal capital flows. These misalignments signal the need for policy action. These misalignments and the associated disturbances are regarded as harmful and must, therefore, be avoided when possible.

Black (1994:281) further states that, in a FEER model, the real exchange rate is used as the ratio of the price between foreign to domestic goods. An assumption is made that both exports and imports are priced in the currency of the seller, and the price being relatively sticky. A less-than-full employment situation is also assumed, given that output is adjusted for internal balance. The Keynesian structural model, M. Fleming and R. Mundell (see 3.5 Fleming-Mundell model), are used in this framework.

3.4.1.2 Model Structure

According to Dvornak *et al.* (2003:3), the FEER has been described as a current account approach to exchange rate determination. This approach is rooted in the BOP identity:

$$\text{Capital Account} = \text{Current Account } \{CA(E,Z)\} = CA(E \cdot P/P^*, Y, Y^*, Z) \quad (1)$$

Where:

- CA = the current account
- $E \cdot P/P^*$ = the real exchange rate
- Y = the level of domestic income
- Y^* = the level of foreign income
- Z = the other variable factors

Dvornak *et al.* (2003:3) explains that, the right hand side of the equation symbolises the current account portion of the Balance of Payments (BOP), which consists of the trade balance, net transfer flows, and net foreign income flows. The balance on the current account is extremely dependent on the real exchange rate, $E \cdot P/P^*$, which determines the prices and volumes of imports and exports. Other determinants of the current account are the levels of domestic and foreign income, Y and Y^* respectively, and a variety of other factors (Z) that may shift the current account over time.

Dvornak *et al.* (2003) further explains that, this approach can be implemented in three steps, namely:

- i. Choose a sustainable level for the capital account, KA_{target} . The target capital account is determined through judgment, optimal savings and investment decision making. The medium-term average of the actual current account is normally taken as the target capital account.
- ii. Derive the underlying current account, as in equation (1) above, given the capital output of the domestic and foreign economies and a set of exogenous factors (Z). Due to the agnostic view of the targeted capital account, focus is placed on the underlying current account. The current account is decomposed into three building blocks to identify the flexibility of each one towards any change in the exchange rate and output.

$$CA = X(E, Y^*) - M(E, Y) - NID(E) + NT \quad (2)$$

Where:

- (X-M) = the net export and imports
- (NID) = the net foreign income
- (NT) = the net transfers

Net investment income and net transfers are modelled as suggested by Wren-Lewis and Driver (1998). The methods are quite simple: investment income is derived from assets denominated in foreign currency and moves in direct correlation with the exchange rate. Net transfers, on the other hand, are assumed to be independent of both demand and the exchange rate.

A different part of modelling the underlying current account equation lies in the trade balance. The trade flows of price and income on underlying trade

balance need to be estimated. With all the estimated trade elasticity, the underlying current account may be modelled as a function of the exchange rate E with equation (2).

Comparisons need to be made over time between countries. Therefore the current account is modelled as a proportion of nominal GDP, which is PY. Equation (2) may then be written as:

$$CA/PY = 1/PY [X(E,Y^*)-M(E,Y)] - 1/PY [NID(E)] + 1/PY(NT) \quad (3)$$

For each assumed value of KA_{target} , solve for the exchange rate that satisfies $KA_{target} = CA(E, Z)$. Solving for the exchange rate is very basic. The level of the exchange rate E is estimated so that it equates CA (E) with the target capital account. This is possible when equation (3) is estimated and output gaps are set equal to zero.

When the exchange rate is E', equation (2) will identify the underlying current account position as CA'. The value will, however, be different from the observed current account because output gaps are not equal to zero. The extent to which the exchange rate must change to equilibrate the underlying current account with the target KA will be determined in equation (3).

Several shortcomings occur in the execution of this approach. According to (Dvornak *et al.*, 2003:7), firstly, judgment is needed to determine the target capital account. Secondly, trade elasticity are different from calculating approximately, and very low elasticity may questionably entail high estimates of the sensitivity of the equilibrium exchange rate to assumed capital account positions. Wren-Lewis and Driver (1998) states that, the third shortcoming is that dynamics of adjustment are not explained; and a more abstract problem is the current account position, and thus the equilibrium exchange rate may change over time, due to other factors such as trends of trade or GDP growth.

3.4.2 Desired Equilibrium Exchange Rate (DEER)

The FEER uses the amount of foreign transactions, such as net export, net foreign income and net transfer to analyse exchange rate fluctuations. The Desired Equilibrium Exchange Rate (DEER) theory, on the other hand, focuses the attention on current account's elasticity to various factors.

The desired equilibrium exchange rate (DEER) approach has been used by many authors as an analytical device to assess exchange rate misalignment. These include Williamson (1985, 1990), Barrell and Wren-Lewis (1989), and Church (1992). Williamson generally used large macro-economic models to

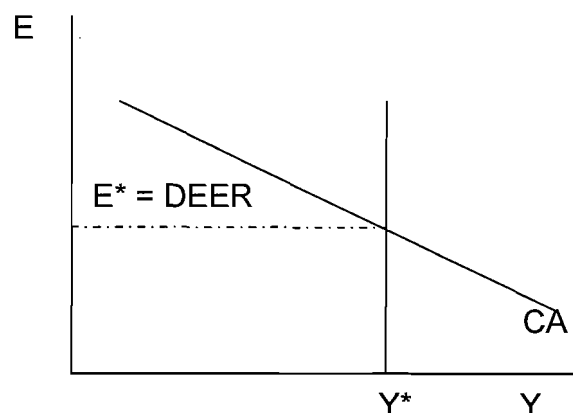
calculate the DEER, whereas Wren-Lewis (1992) noted that the DEER is used as a comparative static calculation. With the given values of the current account and the full employment level of output, the DEER can be described as the real effective exchange rate level that is consistent in the medium term.

According to Bayoumi *et al.* (1994), three elasticities are needed in order to make this a comparative static. These are the current account sensitivity to domestic activity, foreign activity, and the real exchange rate. Other estimates of DEERs are found when different assumptions are used, including the underlying elasticities, the level of potential output, the historical period is used as the base period, and the external balance position. This indicates that reasonable estimates of DEERs vary over a rather wide range. The DEER model analyses the current account sensitivities to the domestic and foreign trade and investment activities. It is based on the assumption that the equilibrium exchange rate is consistent with the macro economic balance

3.4.2.1 The General Concept of the DEER

A definition by Bayoumi *et al.* (1994:23) describes the Desired Equilibrium Exchange Rate (DEER) as the real effective exchange rate at which an economy is in both internal and external macroeconomic balance in the medium term. The time frame of the medium term normally refers to being a period of approximately four to six years. As one can see, this definition is similar as the FEER approach, but medium term in this context specifically means that the period needed for output to return to potential and for the trade volumes to change to competitiveness.

Figure 3-3 Internal and External Balance of DEER Approach



Source: Bayoumi *et al.*, 1994:20

According to Bayoumi *et al.* (1994:20), the DEER approach is specified as an approach in which the equilibrium real exchange rate is consistent with a macroeconomic balance. DEER is based on a set of desired macroeconomic

objectives, such as price stability and balance of payment stability. However, DEER approach itself does not indicate the actual internal and external macroeconomic balance. This approach should therefore not be viewed as a target itself, but rather as facilitating the success of macroeconomic objectives.

Figure 3-3 illustrates that the DEER is associated with internal and external balance. Bayoumi *et al.* (1994:20) interprets it as that, full-employment income Y^* is drawn as a vertical line in the real exchange rate E , and real income Y . The current account schedule CA is drawn for a given level of the current account balance.

$$CA^* = CA(Y^*, FY^*, E^*) \quad (4)$$

Where:

CA = the current account

Y = the domestic income

FY = the foreign income

E^* = the value of the real exchange rate

Bayoumi *et al.* (1994:21) further explains the formula that, if the levels of domestic income Y , foreign income FY and the current account that correspond to internal and external balance were denoted with asterisks, the DEER would be equal to E^* . E^* is the value of the real exchange rate E which is derived from the equation (4).

3.4.2.2 The Advantages and Disadvantages of the DEER

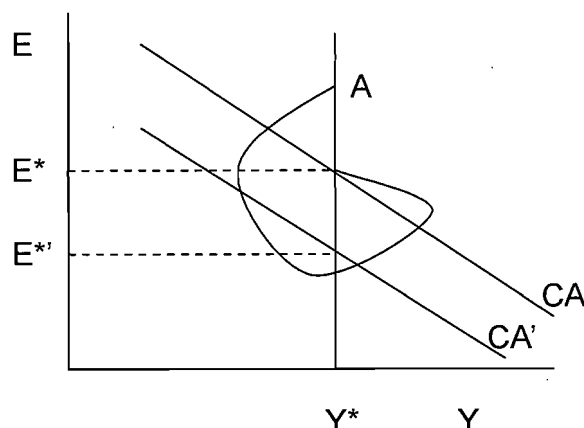
A statement made by Bayoumi *et al.* (1994) indicates that the positive characteristic or the advantage of the DEER approach is its simple and transparent calculations. This feature facilitates the sensitivity testing of the calculations to an alternative assumption. Unfortunately, certain dynamic factors are ignored, for example, the current account figure in the basic period has already been fully adjusted. It is justified by the past output and real exchange rate changes in this method. The impact of the DEER on the path of the equilibrium is also ignored. For instance, the partial equilibrium approach abstracted from matters relating to asset market equilibrium, consequently assumes that interest rates have settled at their equilibrium levels in the medium term.

3.4.2.3 Hysteresis in the DEER

Although the comparative statistic approach does not include adjustments to the DEER, it might be needed to take into account the changes in the country's stock of international debt, if the current account is not at the desired level. According to Bayoumi *et al.* (1994), the DEER needs to be computed

as a trajectory in order to take this dynamic behaviour into account. This is because the equilibrium exchange rate will be dependent on the path of the exchange rate towards its final sustainable value. It can take time for the market to react, as the current account situation of a country changes.

Figure 3-4 Hysteresis Effects



Source: Bayoumi *et al.* (1994)

With another look at Figure 3-3, it is very easy to understand how hysteresis may arise in the DEER. When the actual exchange rate corresponds initially to the value of its DEER, and internal balance is at its desired level, this position will be at (Y^*, E^*) in figure 3-3.

Bayoumi *et al.* (1994) states that, if a misalignment occurs in the next period in such a manner that the actual real exchange rate departs from its DEER value, then the currency therefore would appreciate while output remains at Y^* . This appreciation will lead to the determination of the current account relative to the initial equilibrium position, and the DEER calculation must then be executed once again, because net foreign indebtedness increases as a result of the deficit and will create a responsibility to serving the higher debt.

The departure of the actual exchange rate from its DEER value will force a revision of the existing DEER. According to Cross (1992), a so-called 'hysteresis loop' will develop if the previous DEER were to be re-established. In order to reinstate the previous schedule, the currency will have to be over-depreciated.

Figure 3-4 shows that the departure of the actual real exchange rate from its DEER value. According to Bayoumi *et al.* (1994), if point A is taken as an example, it will require a real appreciation as well as a current account deficit relative to the current account balance underlying CA. The CA schedule must thus shift to CA', and the DEER must devalue from E^* to $E^{*'}$. However, if it is

required that the stock of debt has to be reduced to the original level and the DEER has to return to E^* , an over depreciation would be needed which would result in a hysteresis loop, as seen in Figure 3-3.

Although the DEER approach is transparent and has simple calculations, it does not take into account the actual internal and external factors which could impact the overall balances. The Desired Equilibrium Exchange Rate (DEER) can be seen as a simple method for economists and analysts to assess the exchange rate misalignment.

3.4.3 Natural Real Exchange Rate (NATREX)

Economists encounter two basic problems with existing models: Firstly, many models concentrate on modelling short-term movements in exchange rates to the extent that the real fundamentals are generally ignored. Secondly, the mean and variance of the real exchange rate are invariant over time, and the real exchange rate converges relatively rapidly to the unchanging mean. This implies that the real exchange rate is stationary. A variable is said to be stationary if its mean and variance are both independent of over time (Stein & Allen, 1995). The NATREX Approach is therefore introduced to explain the medium-term and long-term movement of the exchange rate.

According to Stein and Allen (1995), the exchange rates are determined largely by speculative capital flows in the short term. These determinations are based on expectations. Since fundamentals progress gradually, it is very difficult to explain the expectations on a wide set of fundamentals, the short-term movements in exchange rates are thus largely noise. In addition, little attempt has been made to explain the various economic forces, and it is obvious that real exchange rates of major countries are not stationary.

3.4.3.1 The NATREX Approach

The FEER and DEER are the approaches that analysed the exchange rate movements over the short-term and medium term. The goal of the NATREX approach is to clarify movements of medium to long term real exchange rates in terms of the fundamental real variables of productivity.

Allen (1995) states that, the NATREX approach is a very broader concept. It believes that real exchange rates are not stationary because the underlying fundamental productivity does not have means that are independent of time. It assumes that real exchange rates adjust towards their equilibrium level, although these adjustments occur with a lag.

According to Allen (1995:1), NATREX focuses on the medium to longer term,

and it concentrates on real exchange rates. In this approach, the fundamentals are productivity of capital and thrift from both at home and abroad. The NATREX is manageable and produces a testable model that simultaneously explains the equilibrium real exchange rates and non-speculative capital flows. More importantly, NATREX is a moving equilibrium real exchange rate that refers to inter cycling equilibrium exchange rates as determined by real fundamental factors, and responds to continual changes in exogenous and endogenous real fundamentals.

The NATREX theoretical approach clearly specifies the exogenous, control variables, and the variables that are endogenous. Allen (1995:1) reports that, a family of consistent general equilibrium models forms the core of the NATREX approach. These models are rational, optimising in behaviour. It tends to determine the medium-term equilibrium real exchange rates, and provide the logical economic justifications for the empirical results.

The NATREX model has a foundation of rational expectations for the private sector. Stein and Allen (1995) explain that, the NATREX contains an explicit transmission mechanism linking the endogenous variables to the control variables. The efforts of fiscal policy are very important elements for theory and policy concern. In the traditional Mundell-Fleming model (see 3.5), an expansionary fiscal policy appreciates the real exchange rate. In the NATREX model, this is just a medium-term effect. As the rate of debt and growth varies endogenously, the real exchange rate will depreciates below its initial level.

Various macroeconomic models and dynamic equations are used in this approach. Isard (1997:119) emphasises that, the NATREX optimisation process relies on feedback controls and dynamic programming, which guarantees that the ratio of net foreign assets to GDP will converge to an evolving, unpredictable, steady-state value. Dynamic equations are added to the NATREX model to generalise the macroeconomic balance models. The addition implies that many of the effects of changes in control and exogenous variables are more than reversed in the transition from the medium to the longer term.

Allen (1995:6) mentions that, the specific characteristics of the NATREX model may vary according to the economy; NATREX is the equilibrium real exchange rate that clears the BOP in the absence of cyclical factors, speculative capital flows, and movements in international reserves. It focuses on real exchange rates for two main reasons: the real rate determines basic economic decisions about consumption, growth and resource allocation; the other reason is that a moving inter-cyclical equilibrium can be expressed in real terms and which is neutral with respect to money supply.

3.4.3.2 The NATREX Model

If it is assumed that the prices of goods adjust slowly in the short-term, the changes in the real exchange rate closely follow the movements in the nominal exchange rate. Stein (2002) states that, for the short-term movement, orderly explanations in exchange rates are hard to pin down. This is due to the overriding influences of speculative capital flows. The real fundamentals have slight changes in the short-term, and the factors also have little influence on short-term exchange rates.

Based on this reason, the model focuses on medium-term movement. According to Allen (1995), the familiar national income accounts equation may be used to describe the medium-term market clearing equilibrium of the NATREX model.

During the medium term equilibrium, the national income account may be interpreted as the equilibrium condition for the BOP and for the goods market:

$$I - S + CA = 0 \quad (5)$$

Where:

- I = desired national investment,
- S = desired national saving,
- CA = the desired current account.

Stein and Allen (1995) explain that, these variables are measured when the economy is at capacity output, and inflation expectations are met to real inflation. The real exchange rate will appreciate in response to an excess demand for goods, and will depreciate in response to the falling demand; this will ensure that the equilibrium is in balance.

There are a number of advantages of the NATREX model. Allen (1995) indicates that, the NATREX approach avoids the modelling problems of speculative capital flows and cyclical factors when describing equilibrium situations. The starting point for the NATREX model is medium-term equilibrium, which is used to build up the 'long-term equilibrium' of most monetary models. This medium-term equilibrium is where prices have adjusted and output has returned to its inter-cyclical potential level. It is where the real exchange rate has adjusted to its current equilibrium and demand for money equals the current supply of money with no foreign exchange interference by the central banks.

In equation (5), the desired national investment minus desired national savings ($I - S$), gives a description of the sum of the country's excess flow supplies of financial assets. Stein (1995) reports that, with the assumption that

the real exchange rate has no influence on $(I - S)$, the NATREX model is simplified and this has an influence on the trajectory of the real exchange rate.

According to Stein (1995), the desired investment is also independent to the real exchange rate. It is when the domestically priced capital goods are used to produce domestically priced final goods and capital goods, and intermediate goods purchased at world prices are used to produce goods sold at world prices. Both investment and saving are relatively independent to the real exchange rate. It depends on existing stocks of capital, wealth, and net debt to foreigners. As soon as these stocks change, the NATREX equilibrium exchange rate becomes a moving equilibrium.

Stein and Allen (1995:8) emphasise that, exogenous fundamental disturbances, Z , influence the NATREX by affecting desired investment, savings, or the current account. It changes the NATREX in the medium term. The disturbances also change the rates of accumulation of the real stock of physical capital (k), wealth (w), and net debt of foreigners (F). The NATREX will reach a constant level as soon as the economy reaches a long-term equilibrium. This will happen when the Z fundamentals and the stocks of real assets stay constant. However, when there is no growth in labour in the economy, the variables I , S , and CA will be equal to zero in the long-term steady state. At any other stage than the long-term equilibrium, NATREX is a function of exogenous and endogenous fundamentals.

The medium-term equilibrium of the NATREX model is only a simulated creation towards which the economy tends, but never actually reaches. In the same line of thinking, Allen (1995) states the NATREX itself may never be observed. The only observable feature is the actual real exchange rate that tends to adjust towards its moving equilibrium of NATREX. At the different stages of adjustment, the real exchange rate can be described as:

$$R_t = R_t(Z, A, C) \text{ actual disequilibrium rate,}$$

$$R = R(Z, A) \text{ equilibrium rate (NATREX).}$$

$$R^* = R^*(Z) \text{ steady state rate.}$$

Where:

- R_t = the actual rate,
- Z = real exogenous fundamental factors,
- A = the stocks of net real assets,
- C = short-term cyclical and speculative factors.

According to Allen (1995), the equilibrium real exchange rate on the trajectory between R and R^* is estimated as a function of the exogenous fundamental

factors Z, but only the actual rate R_t is observed. The NATREX is a positive, and not a normative concept of the equilibrium real exchange rate that is implied by both the real fundamentals and the existing economic policies.

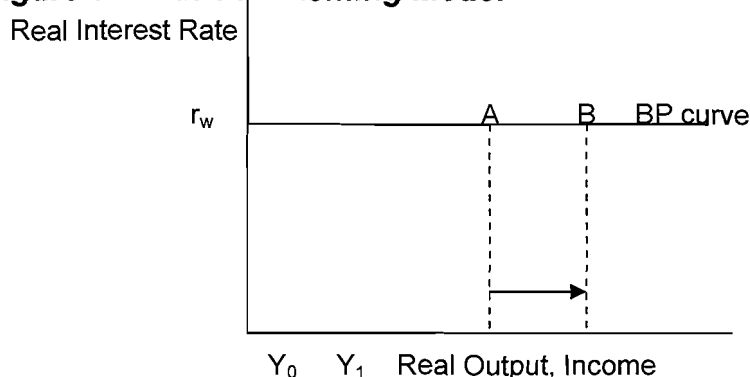
Integration analysis is designed to estimate both the long-term influence of independent variables on the dependent variables. Allen (1995) states that, if the NATREX model precisely describes the structure and behaviour of the economy, the long-term integration equation would approximate the effects of the fundamentals on the long-term, steady state NATREX. The error-correction estimate would simultaneously capture the direct medium-term response of the NATREX as stocks of real assets begin to change.

The study of the three approaches indicated that exchange rate movement is influenced by various factors in an economy. Economists believe the imbalances of the economic fundamentals play a major role in exchange volatility (this will be further studied in Chapter 4). The three approaches introduced above use slightly different concepts to evaluate the equilibrium exchange rate, and the evaluation periods are from short, medium to long-term. The three approaches are used as an indication of a currency's volatility, as well as making trade and investment decisions.

3.5 The Mundell-Fleming Model with Flexible Exchange Rate

The Mundell – Fleming model is one of the theoretical foundations of some of equilibrium exchange rate theories discussed above. This theory emphasises that a country's monetary and fiscal policies have a huge impact on the exchange rate volatility.

Figure 3-5 Mundell-Fleming Model



Source: Colander & Gamber, 2002:287

Colander and Gamber (2002:287) explains that, in small, internationally integrated economies, it is more reasonable to assume perfect capital mobility – investors may buy and sell all the assets they want across countries with no additional cost and risk. With perfectly mobile capital, real interest rates are

the same across all countries, because any interest rate differential is eliminated by the flow of capital. Capital will flow to any economy with higher interest rates, which will then lower its interest rates until the differential no longer exists.

According to Colander & Gamber (2002:287), this assumption indicates that the Balance of Payments (BP) curve is horizontal, as in the Figure 3-5, the capital flow will totally overwhelm any change in current account flows. Economists call this model the Mundell-Fleming Model, which is a model of an open economy with perfect capital mobility. The assumption of a horizontal BP curve is also known as the small country assumption. Flows of capital in small-economy countries are sufficiently large, compared with the size of the economy, to warrant the assumption that capital is perfectly mobile.

Colander and Gamber (2002:287) explain that, in figure 3-5, for small, internationally integrated economies with perfect capital mobility, the BP curve is horizontal at the world interest rate. It is the slightest force that moves the domestic interest rate away from the world rate. It results in a flood of capital outflows or inflows that keeps the domestic interest rate at the world rate.

According to Dornbusch *et al.* (2004:322), under fully flexible exchange rates, any current account deficit must be financed by private capital inflows; a current account surplus is balanced by capital outflows. Adjustments in the exchange rate ensure that the sum of the current and capital accounts is zero.

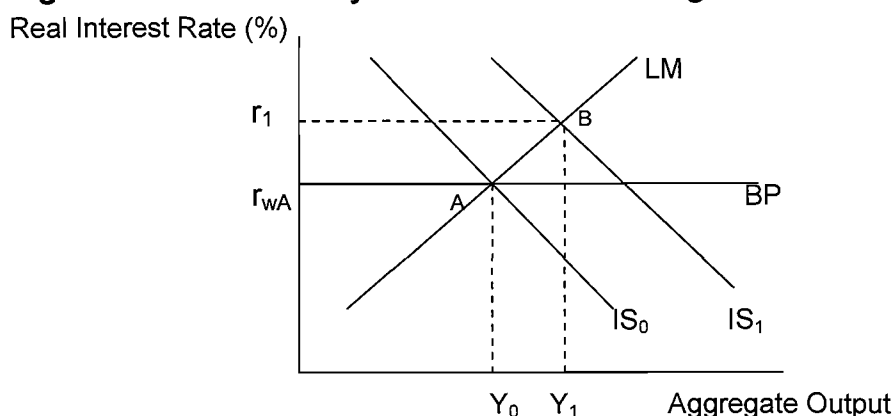
In the next section, it will be explained how monetary and fiscal policy works in the Mundell-Fleming model in an economy that has fully flexible exchange rates and perfect capital mobility.

3.5.1 Fiscal Policy

Now Suppose the South African economy starts at point A in Figure 3-6 below, and the policy makers wish to increase income to Y_1 (point B). Colander and Gamber (2002:290) explain that, by using expansionary fiscal policy, such as cutting taxes or increasing spending, the IS curve shifts out to the right to IS_1 . As the domestic interest rate begins to rise and capital flows into South Africa, the demand for the Rand rises, and the Rand appreciates.

Colander and Gamber (2002:290) state that, with the flexible exchange rates, the government allows the Rand to appreciate, and it continues to do so as long as fiscal policy is pushing the interest rate above the world interest rate. However, the Rand will not appreciate forever. The Rand's appreciation causes imports to rise and exports to fall. Net exports decline, pushing the IS curve back to IS_0 .

Figure 3-6 Fiscal Policy and Flexible Exchange Rate



Source: Colander & Gamber, 2002:290

Colander and Gamber (2002:290) further indicate that, once the economy returns to point A, the Rand stops appreciating, because the interest rate has fallen back to the world interest rate. Fiscal policy has no effect on output in this case because net exports will offset equally to the effect of the expansionary policy.

Dornbusch *et al.* (2004:324) states that, in the analysis of the large open economy with an upward-sloping BP curve, it is assumed that the effect of changes in net exports on the IS curve is sterilised by offsetting fiscal policies, and is focused on how the BP curve shifted in response to the changes.

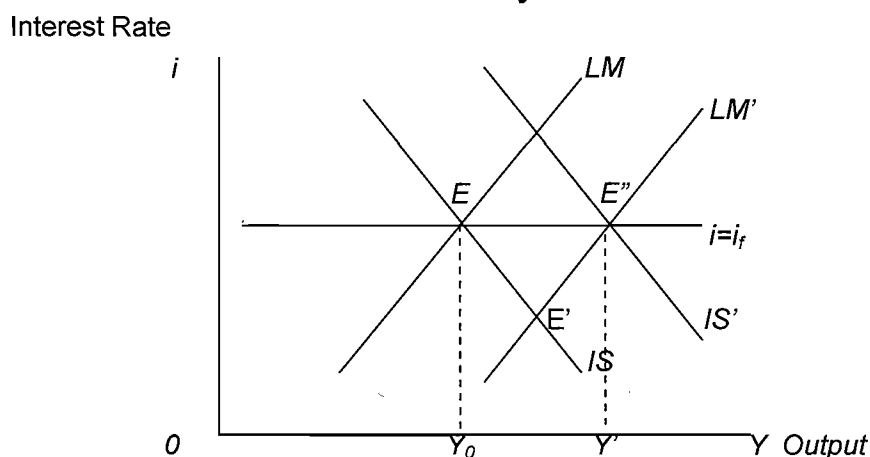
According to Dornbusch *et al.* (2004:325), in a small open-economy with a horizontal BP curve, it is impossible to ignore the effect of changes in net exports on the IS curve, because government cannot offset these movements. For example, in Figure 3-5, to offset the effect of declining net exports, South Africa would have to continue pushing the IS curve to the right, with ever-expanding fiscal policy. The budget deficit would balloon to astronomical levels, and eventually the country would be unable to finance additional expenditures. The IS curve would shift back as net exports declined.

3.5.2 Monetary Policy

A change in money stock, under flexible exchange rates, will lead to an increase in income and a depreciation of the exchange rate. As Dornbusch *et al.* (2004:325) indicate in Figure 3-7, it starts from an initial position at point E and consider an increase in the nominal quantity of money, M. Since prices are given, there is an increase in the real money stock, M/P . At E, there will be an excess supply of real balances. To restore equilibrium, interest rates would have to be lower or income would have to be greater. Accordingly, the LM schedule shifts down and to the right.

According to Dornbusch *et al.* (2004:326), in Figure 3-7 below, at E' , the goods and money markets are in equilibrium at the initial exchange rate, but interest rates have fallen below the world level. Capital outflows, therefore, put pressure on the exchange rate, leading to depreciation. The exchange rate depreciation caused by the capital outflows leads import prices to increase, domestic goods become more competitive, and the demand for the output extends. The IS curve shifts out and to the right, and it continues doing so until exchange depreciation has raised demand and output to the level indicated by point E'' . Only at E'' , are the goods market and money market in equilibrium and compatible with the world rate of interest, resulting in an increase in exports. Consequently, there is no further tendency for exchange rates and relative prices.

Figure 3-7 Effects of an Increase Money Stock



Source: Dornbusch *et al.*, 2004:325

A monetary expansion leads to an increase in output and a depreciation of the exchange rate under flexible rates. According to Colander and Gamber (2002:291), as Figure 3-7 indicates, the economy begins at point E , and the LM shifts to the right as South African investors seek the higher rates of return in foreign countries. To invest in foreign countries, these investors must exchange their Rand for foreign currencies. Demand for the Rand falls and its value depreciates, which causes exports to increase, imports to fall, and the current account balance to rise. The net exports will continue to rise (shifting the IS curve to the right) until the interest rate equals the world interest rate and income rises to Y' . Monetary policy under the flexible exchange rate is effective in changing income, that causes net exports to change, and the total output to rise.

In conclusion, it can be emphasised that a country's government is also a very important participant in the market; its monetary policy and fiscal policy could have a huge impact on the exchange rate movements. As it was discussed in the South African exchange rate systems in Chapter two, the South African

government, mainly the South African Reserve Bank (SARB) used various strategies and policies to control the domestic monetary supply and influence the value of the South African Rand. Therefore, it is important for exporters, importers and investors to have a clear understanding about the meaning of a country's economic policies.

3.6 Conclusion

Economists have developed theories and approaches to measure the real value of the goods, services and assets in a country by taking various macroeconomic factors into account.

The purchasing power parity (PPP) theory uses the long-term equilibrium exchange rate of two currencies to equalise their purchasing power. The Balance-of-payments approach is based on the record of international transactions of the economy; it measures the currency movements through international trade. The asset approach takes capital flow into account; the interest rates differentiations determine the demand of a country's currency.

Due to the need of an equilibrium that acts as a standard against which to measure actual exchange rate changes, different models are introduced. The FEER is associated with underlying balances where economic forces have been worked out. This equilibrium exchange rate is consistent with an ideal macro-economic balance. The DEER does not take into account the actual internal and external balance, but rather the desired macroeconomic balance. Lastly, the NATREX model, which is a moving equilibrium real exchange rate, refers to inter-cycling equilibrium exchange rates as determined by real fundamental factors in medium and long term.

Under a floating exchange rate system, the exchange rate may change from moment to moment. In a system of unrestricted floating, the exchange rate is determined by supply and demand without central bank intervention. The introduction of capital flow, points to the effects of monetary and fiscal policy on the balance of payments, through the effects of interest rates on capital flows. An increase in the domestic interest rate relative to the world interest rate leads to a capital inflow that can finance a current account deficit. When capital mobility is perfect, interest rates in the domestic country may not diverge from those abroad.

This has major implications for the effects of monetary and fiscal policy under floating exchange rates. These effects are summarised in Table 3-1.

Table 3-1 Government Policies under Flexible Exchange rate

Policy	Flexible Exchange Rates
Monetary Expansion	Output expansion; Trade balance improves Exchange rate depreciation
Fiscal Expansion	No output change; Reduce net exports; Exchange appreciation

Source: Lindert, 1991:485

Under floating rates, monetary policy is highly effective and fiscal policy is ineffective in changing output. A monetary expansion leads to depreciation, increase exports and increased output. Fiscal expansion, however, causes an appreciation and completely crowds out net exports.

The theoretical study of this chapter indicates that there are a number of factors which might, directly or indirectly, impact the volatility of the Rand. The Purchasing Power Parity (PPP) explains that the differentiation of the inflation levels have an impact on trade and exchange rate movement; the Balance of Payment Approach emphasises that the terms of trade conditions and the interest rate differentiations will influence the current and financial account of a country, and further impact the currency value; the FEER, DEER and NATREX models are the measurement of the macroeconomic fundamentals, which are the various economic indicators in a economy.

In the next chapter, the empirical study will analyse the role of economic indicators on the exchange rate movement. The chapter will then focus on how economic indicators influence the South Africa's trade and investment level to impact on the value of the Rand.

Chapter 4

International Transactions and Exchange Rate Fluctuation

4.1 Introduction

The openness of the South African economy is one of the government's strategies for the purpose of stimulating economic growth, employment, redistribution of income and wealth in the macro-economy. According to this strategy, a stable exchange rate, or at least a more predictable one is requested for a successful outward economic policy. It is therefore essential to gain an understanding of the propellants of the exchange rate.

Like most of the emerging-market economies, South Africa faces turbulences in foreign exchange markets. As an importer of finished goods and an exporter of raw materials, South Africa is exposed to global economic movements. This has the effect of a high volatility in prices of its domestic currency. The increased volatility of exchange rates in emerging markets is usually attributed to the smaller size of their economies and, consequently, the smaller size of the market for their currency. Apart from transactions having a great impact on exchange rates, investment projects and macroeconomic, as well as political stability are recognised as reasons for a higher variance in currency markets.

Central banks and the private sector are dependent on evaluating the future risk of currency crises in order to prepare policy measures or to hedge against certain types of transactions. A strong Rand has helped to curb inflation and lower import prices. On the other hand, a weakening Rand helps to increase the competitiveness of South Africa's export products prices, and improve the trade balance.

With inflation-targeting in South Africa, including the impact of fluctuations in money and the nominal exchange rate, the determinants and forecasting of inflation became important. In particular, the contrasting developments in the balance of payments, inflation, interest rate, money growth and other economic indicators have led to the relationship between major economic indicators and exchange rate. It has also been noted that movements in foreign prices and the nominal exchange rate are likely to have contributed to the development of a number of economic indicators in South Africa.

This chapter is mainly based on the study of empirical research resources. These resources have been carefully studied, evaluated and compared. A literature study has been done on relevant topics to provide a better insight into the research problem and obtain the necessary background for guiding

the investigation. It is the objective of this investigation to determine the impact of economic variables on the exchange rate of the South African currency against the major currencies in the world.

4.2 Research Methodology

The purpose of this chapter is to examine the relationship among various economic measurements, and the exchange rate in South Africa.

More specifically, the study first examines the relationship between exchange rates and other economic indicators, such as Balance of Payments, inflation, interest rate, money supply and GDP growth. These are the main economic determinants that influence the trade and investment relationship between a country and the rest of the world.

Secondly, time phases are investigated in order to determine the reasons for exchange rate movements at different periods in the South African economy. It mainly focuses on the short-term responses and co-movements among nominal and real exchange rates to adjust the various types of economic situations, with a particular focus on exchange rates, and to adapt to these changes. Issues of a potential structural break in the data since the 1990s to date are also studied. The final objective is to prove that the exchange rate is impacted by international trade and investment between South Africa and the developed countries and visa versa.

The chapter firstly studies the various economic determinants, such as: Balance of Payments (BOP), inflation, interest rate, money supply and GDP growth. These macroeconomic indicators are used as measurement tools for exporters, importers and investors to analyse and make trade and investment decisions.

The second part is the actual investigation, where the reasons for Rand volatilities are investigated with reference to the economic indicators studied in section 4.3. The research investigates six periods, starting from January 1996 and ending in February 2008.

4.3 Factors that Affect the Equilibrium Exchange Rate

As the supply and demand schedules for a currency change over a period of time, the equilibrium exchange rate will also change. International trade and investment performance influence currency supply and demand, and economic variables, such as Balance of Payments, inflation rates, interest rates, economic growth, and political and economic risks are the main factors considered by importers, exporters and investors. This section will explain

how expectations on these factors also exert a powerful influence on currency supplies and demands and, hence, on exchange rates.

4.3.1 Economic Factors

Economic factors are statistical measurements of economic performance in a country. The Economic factors allow analysis of economic performance and predictions of future performance. Economic factors include various indices, earnings reports, and economic summaries, such as Balance of Payments (BOP), inflation or Consumer Price Index (CPI), Gross Domestic Product (GDP) and money supply which will be discussed in the following. Economic factors or variables are primarily studied in a branch of macro-economics called "business cycles". The economic factors serve as a measure for exporters, importers and investors on which investment decisions are based. Their decisions will further impact the trade and investment flows and result in exchange rate fluctuations.

4.3.1.1 Balance of Payments

According to Mohr and Rogers (1996:16), the Balance of Payments (BOP) measures the payments that flow between any individual country and all other countries. It is used to summarise all international economic transactions for that country during a specific time period, usually a year.

As discussed in Chapter two, the BOP analyses the country's volume on exports and imports of goods, services, and financial capital, as well as financial transfers. It reflects all payments and liabilities to foreigners (debits) and all payments and obligations received from foreigners (credits). Balance of payments is one of the major factors that indicate a country's status in international trade, with net capital outflow.

The balance on the BOP is similar to any other account balance. It is prepared in a single currency, usually the domestic. Foreign assets and flows are valued at the spot exchange rate at the time of the transaction.

With reference to the discussion in Chapter three, the balance of payment to exchange rate determination theory, the BOP is influenced by international trade and investment flow. The surplus or deficit on the current account and financial account are very important factors that influence exchange rate fluctuation. It also plays an important role in the monetary model, since it impacts the money demand and supply. The Balance of Payments records all international transactions. The two basic components: current account and financial account, which might be either in deficit or surplus, have an influence on exchange rate movements.

In conclusion, a country's balance of payments measures the differences between the money value of imports and exports. When demand for money changes, the necessary adjustment to achieve equilibrium, occur in the exchange rate (prices change). Therefore, Balance of Payments is one of very important economic factors in exchange rate determination. The current account and financial account performance are major indicators for the importers, exporters and investors to make trade and investment decisions.

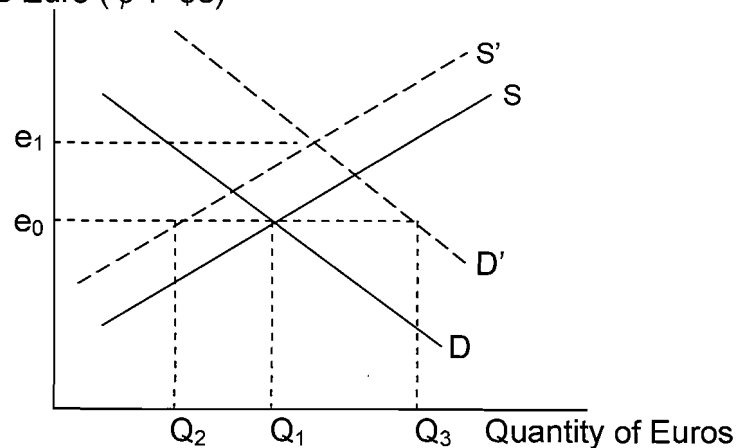
4.3.1.2 The Impact of Inflation on Exchange Rate

Inflation results in the loss of purchasing power. It therefore seems logical that the difference in inflation rates between currencies should have an effect on the prices of their currencies. Colander and Gamber (2002:198) explain it in terms of an example of US and European trade. It supposes that the supply of Dollars increases relative to its demand. This excess growth in the money supply will cause inflation in the United States, which means that U.S. prices will begin to rise relative to prices of goods and services in Euroland. Euroland consumers will give up US products and switch to Euroland substitutes, leading to a decrease in demand for Dollars and Dollar depreciation.

It is indicated by Colander and Gamber (2002:198), in figure 4-1. Inflation results in a shift to the left in the Euro supply curve, to S' as shown below. Similarly, higher prices in the United States will lead American consumers to substitute imports for US products, resulting in an increase in the demand for Euros as depicted by D'. In effect, both Americans and residents of Euroland are searching for the best deals and will switch their purchases accordingly as the cost of US goods change relative to prices in Europe. Hence, a higher rate of inflation in the United States than in Europe will simultaneously increase European exports to the United States.

Figure 4-1 Impact of Inflation on Exchange Rate

Dollar Price of One Euro ($\phi 1=\$e$)



Source: Colander & Gamber, 2002:198

Colander and Gamber (2002:198) further explain that, a new equilibrium rate results, $e_1 > e_0$, when there is a higher rate of inflation in the United States than in Europe. It will lead to a depreciation of the Dollar relative to the Euro, and, likewise, to an appreciation of the Euro relative to the Dollar. In general, when a nation is operating on a relatively high rate of inflation, it normally will find its currency declining in value relative to the currencies of countries with lower inflation rates.

The impact of exchange rates on inflation and visa-versa is well-established. According to Dornbusch (1990:37), the interaction takes place through several channels to influence the exchange rate. It is where the prices of homogeneous commodities traded in world markets are the least controversial. Changes in commodity and capital product prices directly influence the rate of inflation for goods and wages, as well as industrial material manufacturing costs. The prices of traded goods and wages also act as channels for interaction. These channels yield a pervasive pattern of cost and price effects, which are directly and indirectly, associated with exchange rate movements.

Gray and Irwin (2003:3) find that, over the medium and long-term, currency depreciation normally tends to correlate with inflation. This comment implicates that the percentage depreciation in the exchange rate between two currencies should roughly match the percentage difference in the inflation rates. Although this relationship does not hold in the short-term, when investment flows often dominate, it holds fairly well in the long-run, especially when the inflation is high.

According to Edwards (2001:3), one of the solutions is to impose a “ceiling” on tradable prices, and by guiding inflationary expectations, an exchange rate nominal anchor would rapidly generate a convergence between the country’s rate of inflation and the international rates of inflation. This view was particularly popular in Latin America, and was behind major stabilisation efforts in Argentina, Chile, Mexico and South Africa, among others.

Based on the discussion above, there is a close relationship between inflation and the real value of commodities. It impacts the trade and investment activities between countries, and therefore also a country’s exchange rate. In conclusion, inflation has a definite impact on exchange rate volatilities.

4.3.1.3 Exchange Rate and Interest Rate

In recent years, there has been a special interest in the link between exchange rates and interest rates in both advanced and developing countries. This is understandable, since interest rates play a role in determining developments in the nominal and real sides of the economy, in attracting

foreign investments. Among Emerging Market Economies (EMEs), the interest rate is further spurred by the fact that many of them have adopted new monetary and exchange rate policies, and moved to an inflation targeting framework under a flexible exchange rate regime.

Exchange rate variability and interest rate variability have influenced each other more and more in recent years, with the global increase in trade and investment. According to Gray and Irwin (2003:3), an empirical study on some middle-income Asian countries have all declared that their currencies have floated in a post-Asian-crisis period, accompanied by a switch to inflation targeting. While South Africa and Israel, that count among other middle-income inflation targeting countries, also experienced exchange rate volatility with interest rate fluctuations.

Gray and Irwin (2003:3) state that, the changes in relative real inflation adjusted interest rates can have an important effect on exchange rates. It is because interest rates have an effect on financial account transactions and impact the currency demand of a country. When a country's interest rate(s) rises, a higher return can be earned and financial investors worldwide would want to invest in this country. Therefore, an increased demand for that country's currency is created resulting in an appreciation of the currency. For instance, when other macroeconomic factors are stable, if the level of the interest rate in South Africa is higher than the world average, the Rand will generally appreciate against the major currencies of the world.

In general, interest rates tend to be higher in developing countries, in part due to higher inflation rates. Gray and Irwin (2003:3) explain that, based on the theory of interest rate parity, if interest rates are higher in one country than another, the difference reflects the expected depreciation of the higher-yielding currency. Funds would move from the lower-yielding to higher-yielding currency. This movement occurs because markets tend to equalise risk-adjusted expected rates of return, unless the exchange rate is expected to compensate for the difference of the interest rates between two countries.

Gray and Irwin (2003:3) further indicate that, exchange rates are linked to interest rate differentials. A strong exchange rate encourages hope that the real rate of interest will be lowered to reduce the gap between South Africa and its trading partners. Lower interest rates improve the efficiency of production by reducing the cost of funding capital formation. Combined with a strong exchange rate, lower funding costs enable businesses to import capital equipment to replace worn-out and obsolete machines. However, when monetary stimulation comes at a time of currency weakness, inflationary pressures will soon increase with the growth of the economy. Growth may initially be rapid, but often can not be sustained.

The link between interest rates and exchange rates in small open economies is obvious under flexible exchange rates. The interest rate level of a country indicates expansionary or contractionary monetary policies. It is normally followed by the depreciation or appreciation of the currency because of the short-term portfolio transactions inflow or outflow of the country in pursuing high profits.

4.3.1.4 Money Supply

Money supply, or the lack of it, can have an indirect influence on currency values. Money is the generally accepted medium used as payment for goods and services or the discharge of debt. Mohr (2005:177) states that, money is relatively easy to define but difficult to measure in practice. There is no unique operational definition of money which may be used to accurately measure the stock of money. Instead, there are different definitions which relate to the various functions of money. The South African Reserve Bank distinguishes between four monetary aggregates: M1A, M1, M2 and M3.

M1A is the narrowest aggregate and consists of coin and banknotes in circulation plus cheque and transmission accounts of the domestic private sector with monetary institutions. The components of this aggregate accord with the function of money as a medium of exchange. All the assets included in M1A can be used to effect payment to third parties.

M1 is M1A plus other demand deposits held by the domestic private sector. It is a slightly broader aggregate than M1A, but still relates to the function of money as a medium of exchange.

M2 is M1 plus other short-term deposits and medium-term deposits held by the domestic private sector. It is not a particularly significant aggregate, except that it is somewhat more stable than M1A and M1.

According to Colander and Gamber (2002:181), M3 is M2 plus long-term deposits held by the domestic private sector. M3 is the broadest and least liquid of the monetary aggregates and served as the basis for a money supply guideline set by the South African monetary authorities. The main advantage of M3 is that it is less susceptible to changes in individual portfolios as a result of financial innovations or to changes in expectations and the structure of interest rates.

Money supply indicates the amount of money that circulates in the money market, the demand and supply of the currency that impacts a currency value. The money supply will also have a direct impact on inflation, with a resulting impact on currency value. According to Hodge (2005:17), During the period

January – November 1996, the Rand depreciation was mainly caused by the increasing money supply in South Africa, which will be explained in detail at 4.4.4 exchange rate volatility.

4.3.1.5 Gross Domestic Product (GDP)

Gross domestic product (GDP) is generally defined as the total value of all final goods and services produced within the geographic boundaries of a country in a particular period, usually a year. A nation with strong economic growth will attract investment capital seeking to acquire domestic assets. The demand for domestic assets in turn results in an increased demand for the domestic currency and a stronger currency, other things being equal.

According to Ito *et al.* (1997:1), empirical evidence supports the hypothesis that economic growth should lead to a stronger currency. Conversely, nations with poor growth prospects will see an exodus of capital and weaker currencies. A high economic growth rate is most likely accompanied by a high investment rate and high export growth as well. Successful exports produce current account surpluses, resulting in a nominal appreciation pressure on the currency.

As fast growth often invites inflows of foreign capital, some investors in industrial countries pursue high returns as part of a diversified portfolio. Ito *et al.* (1997:1) states that, the capital inflows put pressures on the nominal exchange rate appreciation as it was discussed under the asset approach of exchange rate determination in Chapter three. For example, the demand for the currency of an emerging market country will rise when foreign investors plan to purchase bonds and stocks in that country with its own currency. China's economic development and the appreciation of the Chinese Yuan is a very good example of a situation where increased demand for the currency resulted in the appreciation of the currency.

Put simply, successful economic development, attract higher capital inflow into a country, accompanied by a currency appreciation with improvement in the standard of living. A failure in economic development often results in a loss of confidence in the economy followed by capital withdrawal and currency depreciation.

4.3.2 Trade

Flexible exchange rates, increases the exchange rate volatility and reduces the incentives to trade. It focuses on the impact of exchange rate volatility from trade. It should also be noted, that the Fundamental Equilibrium Exchange Rate (FEER) theory discussed in section 3.4.1, states that trade

flows stabilise real exchange rate fluctuations, thus reducing real exchange rate volatility. These two theories of international trade imply the existence of a relationship between trade flow and exchange rate volatility. The correlation between trade and exchange rate volatility is indicative of the effect of exchange volatility on the trade performance of a country.

When a country has an unbalanced trade performance, its currency indicates high volatility. With South Africa as an example, according to SARB (2008:23), in the period from January 2008 to July 2008, the Rand remained vulnerable to a growing current account deficit. For the period between February 2006 and February 2008, concern about the outlook of South Africa's current account deficit contributed to the weakening of the Rand. This indicated that the trade performance, especially the current account balance has a major impact on currency movements.

According to ITRISA (2007:234), international export and import decisions made by exporters and importers are affected or guided by various economic factors or fundamentals. They further influence the demand and supply of a country's currency, and leads to exchange rate volatility. In the following section the factors that importers, exporters and investors are concerned with when involved in international transactions will be discussed.

4.3.2.1 Factors Considered by Exporters for Trade Decisions

Based on the summary from ITRISA (2007:234), there are a number of factors considered by exporters before they make trade decisions.

The current and financial account balances of target markets broadly indicate whether the markets are good credit risks, i.e. whether they can settle their import bill through their export performance and net capital flows. Furthermore, if the target markets are experiencing a rapid decline in the value of their currencies, it could lead to a draining of the level of foreign exchange reserves in countries as the national authorities attempt to defend the value of their currencies. This, in turn, could lead to delayed payment for imported goods.

As discussed in section 4.3.1, economic growth and development analysis help the exporters to determine the general standard of living as well as demand and consumption patterns in certain target markets. The inflation level in the markets concerned throws light on citizens' propensity to save or spend, while interest rates indicate whether economic activity is being constrained or encouraged. The current account in the balance of payments in the target markets reveals the extent of import activity.

The value of exporter's and importer's domestic currencies play a key role in an exporter's ability to offer competitively priced products in foreign markets. While a weak currency in target markets has the advantage of making exports relatively cheap. In addition, the inflation level in the exporter's country, as well as the company tax rate and interest charged on overdrafts and other forms of finance all affect the cost of production, and hence the exporter's ability to be competitive.

4.3.2.2 Factors Considered by Importers for Trade Decisions

The factors are to a large extent similar to the factors considered by exporters. Importers in a country will also need to do an economic analysis before making a choice whether to trade with other countries or not.

According to ITRISA (2007:235), economic growth and development analysis helps an importer to gauge the general level of sophistication in potential supplier countries, and therefore the likely standard of workmanship and quality of their products. Interest rates in these countries give a clue as to whether or not economic activity is being actively encouraged, having important implications for consistency of supply. Furthermore, the current account in the Balance of Payments of supplier countries reveals the extent of export activity.

Products sourced from countries with a weaker currency than that of the importer's country have the advantage of being relatively cheap. The existence of export assistance schemes in supplier countries also bodes well for competitive export prices and consistency of supply. The general trend, with regard to inflation and interest rates, has to be monitored, as a pronounced rise in either case may lead to high cost production in the supplier countries and less competitive exports in the longer term.

From the above discussion in section 4.3.1., it indicates that various economic factors play a very important role in exporters and importers' trade decisions. The performance of a country's economic variables, have impacts on the country's trade performance. Furthermore, the trade activities influence the demand and supply of the country's currency, and the exchange rate volatility, and visa versa.

4.3.3 Investment

International transactions include both trade and investment flows. In the following section, the relationship between the investment flows and exchange rate volatilities will be discussed.

According to Jones and Kenen (2003:709), International capital flows can help an economy develop and spreads the benefits of prosperity to all the citizens when those flows are steady rather than for speculation. There are three types of long-term private capital flows: foreign direct investment (FDI), loans, and portfolio flows.

According to Jones and Kenen (2003:709), as in most developing countries, such as China, FDI constitutes the largest portion of capital inflows to the emerging economies to stimulate economic growth. It suggests that beyond adding to existing capital stock, FDI may stimulate a small amount of additional investment in various sectors in the host economy, such as the “crowding in” or “spillover” effects. The second largest type of foreign capital flow into the emerging countries is loans. The importance of loan flows grew toward the end of the period, as many foreign banks acquired subsidiaries in the transition countries. Finally, there are portfolio flows. The portfolio flows have been much larger than loans in the low- and middle-income countries as a group, since the beginning of the 1990s.

It is evident from the South African Reserve Bank Quarterly Bulletins (SARB, 2008:27), that South Africa has attracted relatively little foreign direct investment (FDI), but considerable amounts of portfolio inflows. Unlike in other emerging markets, the composition of capital inflows in South Africa appears to be biased toward portfolio investment. Capital inflows may bring substantial benefits to the recipient country and promote economic development, but different types of flows may have different effects. In terms of capital inflow, sudden shifts in market sentiment may lead to large reversals of portfolio flows, which, in turn, may cause detrimental economic effects.

Based on the study, there are a number of factors which are considered by investors to determine the level and composition of capital flows to the foreign markets and to draw policy conclusions for South Africa are:

- *Macro-economic performance*

A rapidly growing economy is likely to offer higher future earnings and thus higher rates of return, coupled with lower risk.

The investors use measurements of lagged GDP per capita growth as a proxy for growth prospects. The expected sign of the coefficient is positive for FDI and portfolio flows.

- *Investment environment.*

The openness of the economy, degree of exchange rate and inflation volatility, and exchange controls are the key ingredients of the investment environment.

Exchange rate volatility impacts all the investments, especially on portfolio flow investment, since portfolio investors with a short investment horizon may be able to hedge currency risk easily. It could attract portfolio investors with a higher risk tolerance and make speculators more interested in participating in the stock market, leading to an increase in portfolio investments. Inflation volatility is another important source of uncertainty for foreign investors, since it is the measurement of the real value of a currency or an investment.

- *Infrastructure development.*

Both the quality of the infrastructure and the cost of gaining access to these resources determine the attractiveness of a location.

A well-developed infrastructure facilitates easy access to the information-gathering for business and reduces distribution costs, thus promoting local and regional trade.

- *Financial market development*

The more developed the financial markets of a country are, the greater the capital flows are attracted to the country.

Well-developed financial markets appear to be a precondition for portfolio inflows. The domestic credit to the private sector and the domestic stock market capitalisation of listed companies as a percentage of GDP as proxies for financial development expect a positive relationship between financial development and capital flows, particularly for portfolio flows.

- *International Market*

The principal global variables that influence capital inflows are international interest rates and business cycle developments in industrial countries.

Foreign investment decisions are determined in part by opportunity costs. Real short-term and long-term interest rates are used as an indicator for global developments. It hypothesises that international long-term interest rates are important for portfolio flows. A large part of this is short-term, therefore the money market rate may play a larger role. In both cases, the expected sign of the coefficient is negative.

- *Global Financial Crisis*

During a financial crisis, investors prefer to hold smaller amounts of riskier assets; thus, low-risk currencies, those associated with more politically and economically stable nations are highly valued.

The global financial crisis of 2008-2009 is still an ongoing major financial crisis. It started with the failures of large financial institutions in the United States, and rapidly evolved into a global financial crisis, resulting in a number of European bank failures and declines in various stock indexes. It also resulted in large declines in the market value of commodities world wide. As a country that is reliant on commodity exports, South Africa is experiencing the shrinking demand of the commodities. This resulted in a depreciation of the Rand since the end of 2007.

In conclusion, the above information indicates that exporters, importers and investors in the world markets are primarily concerned about the economic factors or variables which will help them to realise favourable returns, such as BOP figures, the level of interest rates, inflation and economic growth, the extent of government debt and the soundness of the financial system. With South Africa as an example, when the general economic performance is positive, with a high economic growth rate, low inflation, and more foreign investments flowing into the country, the demand for the Rand increases, resulting in a Rand appreciation. In contrast, when the economy is in a bad situation, the Rand normally depreciates.

In the next section, a study to determine the relationship between trade, investment and Rand volatility will be done.

4.4 Selected Periods of Rand Volatility in terms of Trade and Investment

4.4.1 Introduction

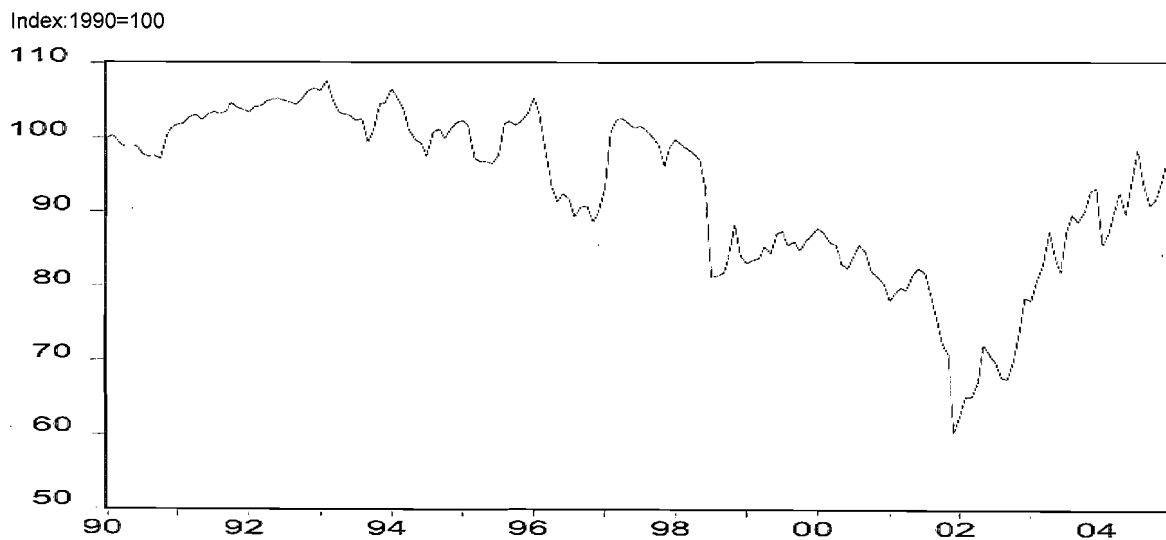
Exchange rates across the world have fluctuated widely particularly after the collapse of the Bretton Woods system of fixed exchange rates. Since then, there has been extensive debate about the impact of exchange rate volatility on international trade and investment. According to Todani and Munyama (2005:1), the most commonly held belief is that greater exchange rate volatility generates uncertainty, thereby increasing the level of risk of trade and investment activity, which will eventually depress trade. On the other hand, export and import trading, and investment activities also influence the volatility of a country's currency, and the real value of the currency.

In this section, with the study of the Rand behaviour, the SARB Quarterly Bulletins in a number of years have been used as a prime source to analyse the Rand values, movement and other aspects. The reason is SARB Quarterly Bulletins are the most reliable source and have also been used by other reporters of economic information, such as the IMF and the WTO, as their prime source of information on Rand values.

The South African Rand experienced various periods of volatility since the 1990s. It is argued that the strength of the Rand will damage export sectors, economic growth and employment, especially in the manufacturing export and import-competing industries. The response to such a misalignment might be a change in macroeconomic policy to bring the currency within a more competitive range. The weak Rand will also cause damage, such as high cost of import products and high inflation. The solution for this situation is to encourage sound macro-economic fundamentals, such as a high growth rate, and better interest rates to counter a declining Rand.

According to Hodge (2005:4), there is a clear difference in the relative behaviour of the exchange rates of the Rand in the 1990s compared to the experience after 1980. In the 1980s the large declines in the nominal effective exchange rate mainly reflected the much higher average inflation rate compared to that of the main trading partners. Thus the nominal effective exchange rate diverged significantly from the real effective exchange rate. After 1990 the average inflation rate in South Africa began to fall and fluctuated in a much lower range so that the difference between the two exchange rates became much less pronounced. In the 1980s, monetary policy was, on average, much looser and more variable than what has been the case since the early 1990s. This contributed to a much higher average inflation rate and a more variable real economic growth rate compared to the 1990s.

Figure 4-2 The real effective exchange rate of the Rand from 1990 to 2004



Source: Hodge, 2005:13

Hodge (2005:4) emphasises that, since its low point in December 2001, the Rand has appreciated almost uninterruptedly against most other currencies for over three years. Against the US Dollar, the Rand has appreciated by

about 75 percent until September 2004. This is quite exceptional given the previous history of the exchange rate. For most of the 1980s and the 1990s the Rand depreciated against the currencies of the main trading partners. This has raised concerns that the more recent volatility and sustained strength of the Rand have restricted growth and employment, particularly in the manufacturing export and import-substitution industries”

From Figure 4-2 above, it can be seen that the Rand value was relatively stable from 1990 to 1994. From 1994, the Rand started to become more volatile and depreciated dramatically with other emerging market currencies and reached its lowest level in 2002. The sharp and sustained appreciation in the real value of the Rand from the beginning of 2002 to its present levels is a correction from the very low levels it had fallen to.

With the real effective exchange rate as a broad indicator, the competitiveness of the manufactured goods in world markets has changed significantly compared to the average experience over the period 1990 to 1997. Hodge (2005:13) indicates that, the average of the lowest monthly value of the index for each year over this period is 97.6 compared to its highest value of 98,3 in July 2004. The Rand was at an uncompetitive level during the 1990-97 periods.

Following three years of significant appreciation, the nominal effective exchange rate of the Rand displayed notable fluctuations during the course of 2005 to February 2006. The nominal effective exchange rate of the Rand depreciated dramatically from the second quarter of the 2006. According to SARB (2008:30), from the end of December 2007 to the end of February 2008, the weighted average exchange rate of the Rand declined further. Factors influencing the performance of the Rand over the year included the current account deficit, continuing turmoil in international financial markets and concern about the supply of electricity which clouded the outlook for exports and economic growth in South Africa.

4.4.2 The Reasons for Rand Volatility

In the following sections, the reasons for the fluctuations in the South African currency will be investigated as part of the study.

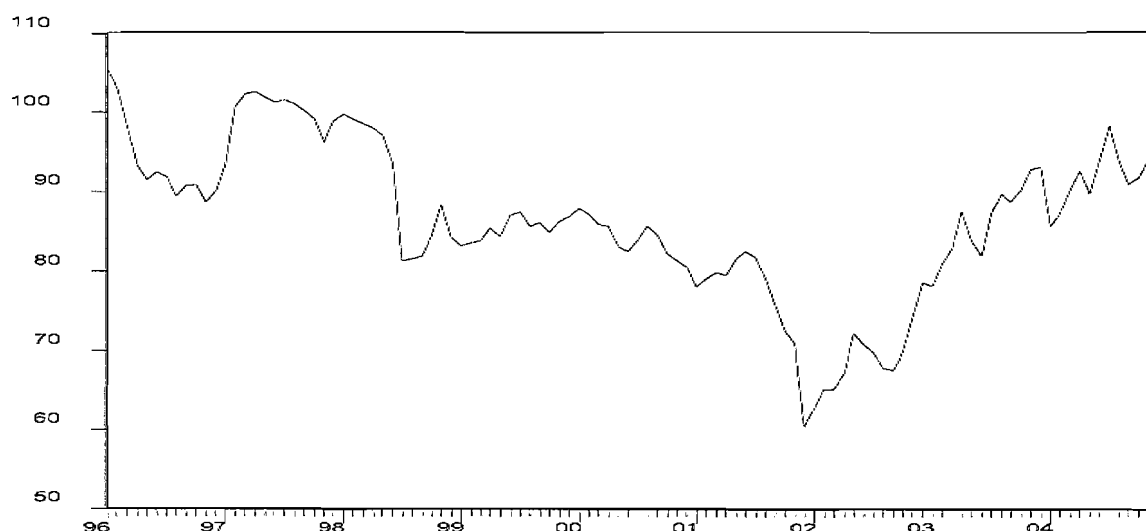
Since 1990 there have been four main episodes of Rand depreciation and two episodes of Rand appreciation. According to Hodge (2005:16), the episodes in which the Rand fluctuated significantly were essentially recoveries, to varying degrees, the Rand appreciation and depreciation were caused by various reasons, mainly by the activities of trade and investments. But when a closer look is taken, it was triggered by the performance of a number of

economic factors, discussed in section 4.3.1, such as the BOP, inflation and interest rate levels. When compared to other countries, these factors were considered by importers, exporters and investors, and therefore became the major influences on trade and investment flows to South Africa.

Hodge (2005:16) explains that, the main episodes of Rand depreciation took place during the first half of 1996 and recovered in 1997, under the impact of the Asian financial crisis during 1997. The Rand started to depreciate again at the beginning of 1998. By the second half of 2001, the Rand value dropped to its historical low level. During 2006, the Rand value started to fall again which was caused by unbalanced trade performance (See Figure 4-10). At the end 2007, the Rand took a further decline during the global financial crisis. The Rand appreciation occurred in the first half of 1997. Another appreciation followed a sustained recovery from 2002 to 2004. This recovery followed a dramatic depreciation that started in 1998.

Figure 4-3 Real Effective Exchange Rate of the Rand 1996-2004

Index: 1995=100



Source: Hodge, 2005:16

Figure 4-3 focuses on the changes in the real effective exchange rate of the Rand from 1996 to 2004, which will be referred to in the explanation of each period in subsections. Figure 4-10, as indicated later, will provide a clear exhibition on the Rand volatility from 2004 to 2008.

4.4.2.1 Rand Depreciation: January 1996 – November 1996

According to Hodge (2005:16), from January to November 1996, the average real effective value of the Rand depreciated by 18,7 percent. This sharp decline followed five years of relative stability. It is interesting to note that from 1990 to 1995 the maximum change in the real value of the Rand in any

calendar year was a 9,2 percent depreciation between January and July 1994, spanning the landmark election in April 1994. The average of the maximum absolute change in the Rand for each calendar year from 1990 to 1995 was only 5,8 percent.

An underlying reason for the decline in the currency was a growing current account deficit. Hodge (2005:17) indicates that, the current account deficits in 1995 and 1996 were the first in over ten years. Since the debt standstill in 1985, restrictive policies were necessary to ensure sufficient current account surpluses for the repayment of foreign loans. The abnormal political situation in South Africa before 1994 meant that, unlike the norm in other developing countries, it could not rely on capital inflows to finance deficits on the current account. This unenviable position changed for the better with the historic 1994 election and the normalisation of the political landscape. Net capital inflows including unrecorded transactions from the rest of the world turned positive in 1994 for the first time since the foreign debt crisis and moratorium in 1985 and have remained so every year since, despite being highly volatile.

According to SARB (1997:30), there were more than adequate inflows across the financial account to accommodate the current account deficit of R7,1 billion in 1996. The main contributor to the surplus of R13,4 billion on the financial account was the large net inflows of portfolio capital. However, there were almost just as big outflows of foreign exchange of R10,3 billion from unrecorded transactions in the balance of payments. The net result of the above-the-line transactions in the balance of payments was a significant decline in the net gold and foreign exchange reserves, indicative of the selling pressure against the Rand.

Hodge (2005:17) explains that, the extent to which the positive net inflows of foreign capital were offset by the outflows from unrecorded transactions shows the schizophrenia present in the financial markets at this time. On the one hand, foreign capital was attracted by the relatively higher expected risk-adjusted returns on portfolio investments in South Africa, especially since the scrapping of the financial Rand in March 1995. However, this did not extend to large increases in longer-term commitments of foreign direct investment.

According to Hodge (2005:27), in this period, South African residents wanted to diversify out of Rand into foreign assets but were largely prevented from doing so legally by tough exchange control regulations. In 1996 such controls had yet to be relaxed significantly on residents.

The SARB (1997:30), states that the changes in net gold and foreign exchange reserves due to the transactions in the Balance of Payments are only part of the explanation of changes in the exchange rate. Another reason

is the Reserve Bank intervention in the foreign exchange market. For example, in 1993 the decline in the net reserves owing to Balance of Payments transactions was almost double of that in 1996, and yet the Rand depreciated far less.

Sarno and Taylor (2002) explain how official intervention in the foreign exchange markets can influence the short-run behaviour of the exchange rate. There are two main ways in which the Bank can intervene in the foreign exchange market. It can either use the reserves or use the forward exchange market. The main reason why the Rand depreciated less than one would have expected in 1993 was that the Bank provided foreign exchange to the market from its reserves. An indication of the extent to which it did so was the increase in the Bank's foreign liabilities of R7,4 billion in that year. The idea behind such intervention is that the foreign borrowings may be repaid later when the above-the-line balance moves back into a surplus.

The rationale for the Bank's intervention in the forward exchange market needs further explanation. Hodge (2005:18) explains that, during most of the 1990s the Bank tried to maintain both the internal and external value of the Rand. The Bank thus followed a managed floating exchange rate policy in which it sought to reduce sharp fluctuations in the exchange rate, but without changing the market led trend in the currency. Unfortunately, the country's foreign exchange reserves were not big enough to absorb the continuing pressure against the Rand. With increasing pressure, the Bank purchased Dollars in an attempt to reduce demand for Dollars. But the more the Bank intervened in this way, the greater the increase in its oversold forward book and the decline in its international liquidity position. This left the country exposed to the risk of losses if the Rand depreciated again later

The main reason for the Rand depreciation in this period was the current account deficit, and the huge amount of capital outflow through the unrecorded transactions. The result of these transactions was the significant decline in the net gold and foreign exchange reserves. However, the Bank intervened in the forward exchange market in order to actively manage the exchange rate, especially when the Rand came under intense market pressure to depreciate. Without the intervention the Rand might have depreciated even more sharply. The extent to which the Bank took advantage of recoveries in the Rand to lower its oversold forward position may have lessened its rate of appreciation.

4.4.2.2 Rand Appreciation: November 1996 – April 1997

In the tug-of-war between foreign investors wanting to increase their Rand asset portfolio investments, and residents wanting to increase their stock of

foreign assets, the former prevailed decisively in 1997. Figures from SARB (1998:31) indicates that, In the first half of the year, the surplus on the financial account surged to R23.7 billion and outflows from unrecorded transactions fell to R4.9 billion. Thus, the net capital surplus far exceeded the current account deficit of R5.2 billion over this period. The real effective exchange rate of the Rand recovered, with the currency appreciating by 15,7 percent between November 1996 and April 1997. It thus retraced most of the ground it had lost during the prior episode of depreciation.

Hodge (2005:19) explains that, the widening real interest rate differential, with the Bank rate reaching 17 percent in November 1996, was the main reason for the Rand depreciation which discussed in the asset approach in Section 3.3.3. The bank rate had been increased steadily from its lows of 12 percent in 1994 in an effort to keep the domestic inflation rate within single digits. The real bank rate climbed even more sharply, from 2 percent early in 1994 to over 10 percent in the second quarter of 1996. Thus the recovery of the Rand after this peak in local interest rates was an indirect result of the tight monetary policy deemed necessary to control inflation.

SARB (1998:36) explains that the reason is that, foreign investments, attracted by the relatively high interest rates, resulted in portfolio investment inflows growing to a massive R51,6 billion in 1997. It became the second largest inflow ever recorded in this regard. More than half the inflows comprised investments in fixed income securities. It might normally be expected that the high real interest rate differential would also dampen the desire of resident investors for foreign assets. However, portfolio investment outflows also grew substantially to R21 billion as residents largely ignored the high interest returns available locally. The composition of the outflows was the exact opposite to that of the inflows, with most of the increase in foreign assets comprising equity investments by residents.

As mentioned above, this was due to the desire by residents to diversify their investments. It allowed the gradual relaxation of exchange controls. Hodge (2005:20) states that, foreigners clearly saw the high interest returns available locally as more than sufficient compensation for the possibility that the Rand might depreciate further. The expected return outweighed the potential risk. Residents had adverse perceptions about the Rand which increased the tendency to sell Rand in exchange for more stable currencies than merely diversify their investments. Continued outflows of foreign exchange from unrecorded transactions, although much lower than experienced in 1996, reinforce this suspicion.

The investment outflow caused the dramatic Rand depreciation. SARB (1998:33) reports that, the Bank intervention from the last quarter of 1996 until

the second quarter of 1997 was fairly muted, allowing the Rand to recover from its earlier episode of depreciation. However, the massive improvement on the financial account referred to above, gave the Bank scope to bring down its oversold position on the forward book. The Bank's international liquidity position improved accordingly, from its low of -US\$22,2 billion in December 1996 to -US\$16,8 billion by June 1997.

In conclusion, the above analysis suggests that the appreciation of the Rand from November 1996 to April 1997 reflected the extent to which net foreign exchange entered the country via the financial account. It enabled the financial account surplus to compensate for the outflows from growing current account deficits and unrecorded transactions. In short it can be said that the appreciation of the Rand resulted from the increased demand for Rand by foreign investors. Intervention by the Reserve Bank probably played a role in lowering the rate of appreciation in the Rand over this period.

4.4.2.3 Rand Depreciation: January 1998 – July 1998 and its Recovery

The recovery in the Rand did not last very long. The emerging markets crisis that originated in South East Asia in 1997 soon caught up to the local markets. Initially it was hoped that South Africa would escape the 'Asian contagion' as local circumstances were quite different regarding the factors that had invited the speculative attacks on the currencies of Thailand, Malaysia, Indonesia and the Philippines. This discussion refers back to section 4.3.3, how financial crises impact a country's currency value.

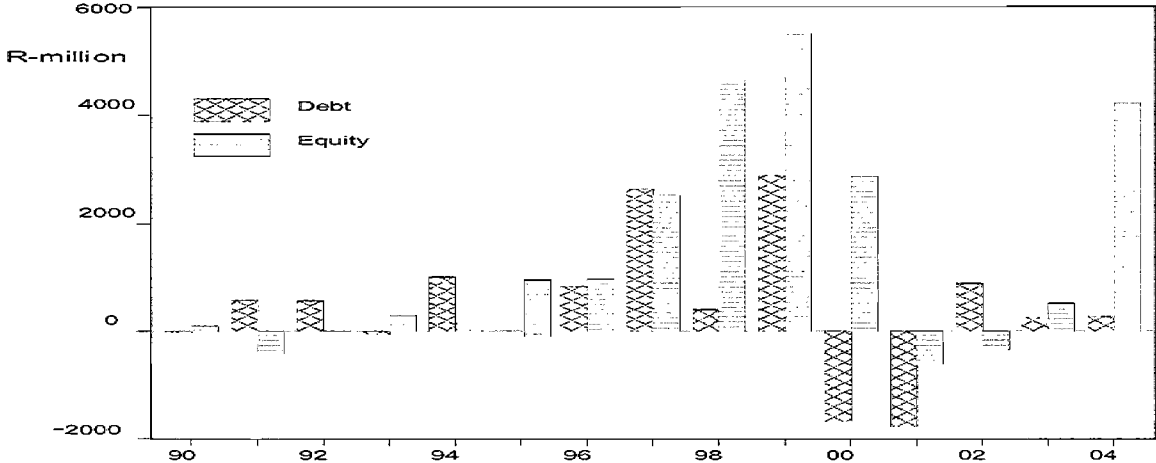
The Asian financial crisis had a negative impact on the Rand. Hodge (2005:20), mentions that the Rand remained vulnerable to a growing current account deficit that topped R13 billion in 1998. Moreover, in the flight to the safe haven of hard currencies like the US Dollar, the Rand was dumped indiscriminately along with other emerging market currencies. The sell-off occurred despite a huge widening of the real interest differential as the bank rate was hiked by nearly 7 percentage points to 21,85 percent between April and August 1998.

South Africa could not escape from the impact of the Asian Financial crisis. The Rand depreciated dramatically from January 1998 to July 1998, caused by the withdrawal of foreign portfolio investments. The sell-off occurred despite the increase in the bank rate. It appears that during a major financial crisis, investors seek security in first world currencies such as Dollar, Pound and Euro. No respect is shown for the currencies of smaller countries which are easily rejected in favour of major currencies.

Unlike the sharp recovery of the Rand from its depreciation in 1996, the Rand

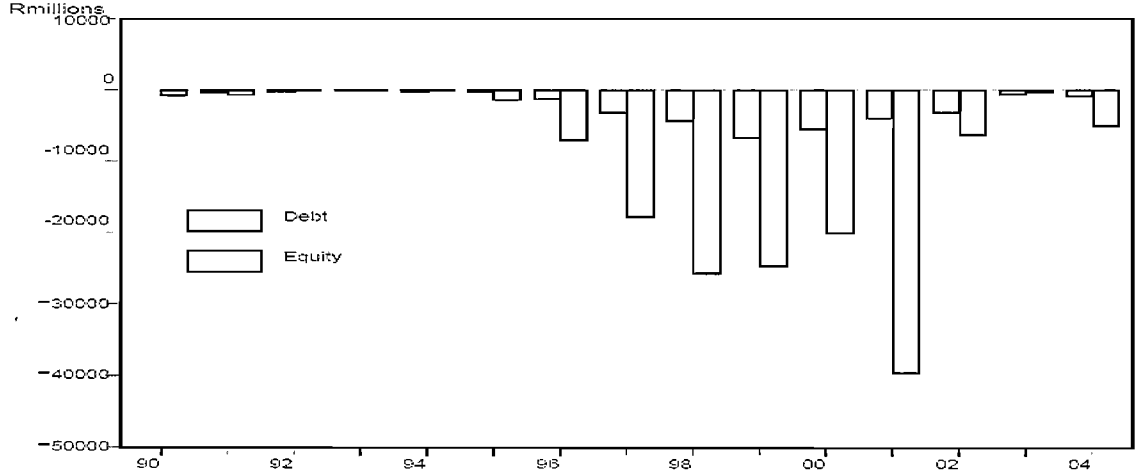
staged only a mild rebound following the emerging markets crisis. SARB (2000:32) underlined that, in 1999 the Rand ended the year only 6,9 percent higher than its low point in July 1998, despite a resumption of hefty financial account surpluses from the fourth quarter of 1998. This presents a problem in two respects, as explained below.

Figure 4-4 Annual Portfolio Inflows (Liabilities), 1990-2004



Source: Hodge, 2005:22

Figure 4-5 Annual Portfolio Outflows (Assets), 1990-2004



Source: Hodge, 2005:22

According to Hodge (2005:22), between October 1998 and January 2000, the Repo rate (which had replaced the bank rate in June 1998) was almost halved, falling by over 10 percentage points. A material lowering of interest rates would result in a decline in foreign investments and reduce the surplus on the financial account. That could explain the muted recovery of the Rand. However, despite the Repo rate being lowered even more dramatically than the bank rate had been raised during the emerging markets crisis, the cumulative surplus on the financial account actually grew to R35,3 billion from

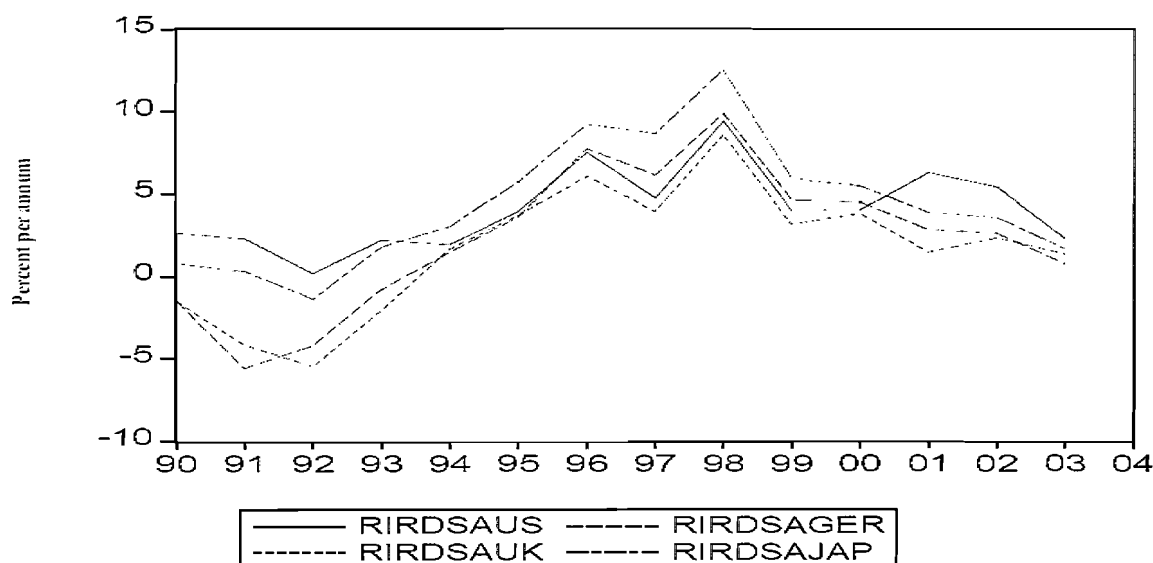
the last quarter of 1998 to the end of 1999.

The main reason for this was that the focus of foreign investors had shifted to South African equities and the bond market rather than money market investments. The shift to equities was especially pronounced in the third quarter of 1999. Lower interest rates enhanced the prospects for economic growth and a rebound in an oversold equity market in the aftermath of the emerging markets crisis. An opportunity for quick capital gains in the bond markets as yields fell and prices rose also presented itself to canny investors.

In this respect, the exchange rate volatility and interest rate, asset approach models regarding the interest rate differential can be the guidance to understand the exchange fluctuation in this period. A widening of the interest rate differential may lead to an increased net inflow of capital and an appreciation of the currency, as was the case between November 1996 and April 1997. But a narrowing of the differential may lead to the same result, since it may alter the composition of capital flows without necessarily changing its net inflow thereof, as was the case in 1999.

One feature of the foreign capital flows shown in Figures 4-4 and 4-5 is that equity investments have been greater than investments in interest bearing securities over the sample period. This is the case for both foreign capital inflows (liabilities) and outflows (assets). As regards outflows, it is evident in Figure 4-5 that South African residents have primarily invested in foreign equities. Even when interest rate differentials have widened considerably, it has been largely ignored in favour of those foreign investments.

Figure 4-6 Real Interest Rate Differentials between South Africa and the US, Germany, Japan and the UK



Source: Hodge, 2005:23

Figure 4-6 shows how the real interest rate differential between South Africa, the US, Germany, Japan and the UK peaked in 1998, approaching 10 percent against the US. Despite the attractive domestic returns, foreign equity investments by South African residents surged in 1998.

According to Hodge (2005:23), there are several reasons for this movement, such as the capital flows from developed countries, and higher interest rates in South Africa, but the most important is probably the relaxation of exchange controls after 1994. Whatever the reason, stated by Hodge (2005:23) the real motivation was risk management. South African residents now had the opportunity to diversify their assets abroad legally. The massive increase in the capital outflow from 1996 to 2004 is indicated in Figure 4-5.

Foreign capital inflows were also largely dominated by the demand for South African equities rather than debt, although there were times when the widening interest rate differential proved just too tempting, as shown in Figure 4-6. In 1999 the cumulative surpluses on the financial account far exceeded the, by then, declining deficits on the current account. According to SARB (2000:33), the main reason for the surge of the financial account was the massive inflow of foreign equity investment as shown in Figure 4-4. The net result of the Balance of Payments was an increase in the foreign exchange reserves of nearly R25 billion. The challenge here is to explain why the Rand did not appreciate far more than the mild recovery it had staged after the emerging markets crisis.

This fact indicated that government monetary policies to influence financial account transactions could play a very important role on impacting the market price of a currency. The theoretical study in 3.5 the Mundell-Fleming Model with flexible exchange rates and the study of the reason for Rand depreciation in this period indicated that monetary and fiscal policies, such as changes in interest rates and relaxation of exchange control regulations, are very effective tools to influence a currency's fluctuation in an economy, especially if the currency is often under speculation attack.

4.4.2.4 Rand Depreciation: June 2001 – December 2001

After the emerging markets crisis of 1998, the Rand stabilised and moved in a relatively narrow range around its lower levels. But from June to December 2001, the Rand depreciated sharply under renewed speculative attack.

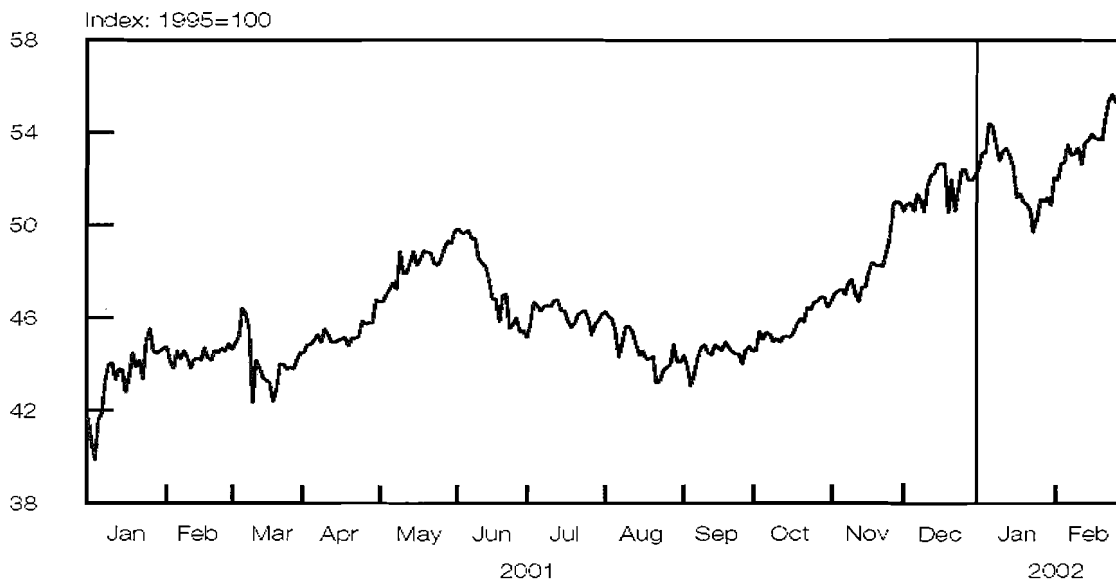
Hodge (2005:24) indicates that, over this period the real effective value of the Rand fell by 26,9 percent. As was the case during the emerging markets crisis, most of the depreciation was concentrated in a single month. In December 2001 the average real value of the Rand fell by 14,8 percent compared to the

previous month, This fact indicated that portfolio investment could have a huge impact on the value of the Rand in a short term. As discussed in Chapter two, it is very unhealthy for the South African economy. Therefore, a managed floating exchange system will be more sufficient to protect the economic stability.

Above-the-line balance of payments transactions were not the main reasons for the depreciation of the Rand in this instance. Hodge (2005:24) reports that, a fairly big current account deficit of R4,6 billion was recorded in the third quarter of the year, but it moved back to a small surplus in the fourth quarter. A net deficit on the financial account was largely offset by inflows from unrecorded transactions. The net result of transactions above-the-line was what would normally have been a manageable Balance of Payments deficit of about R2,3 billion in the fourth quarter of 2001.

According to SARB (2003:38), two main factors may be singled out during this episode of depreciation in the Rand. First, the Reserve Bank had stated that it would continue to close out its oversold position on the forward book with the intention of bringing it down to zero as circumstances permitted. To achieve this goal implied that the Bank would buy surplus Dollars in the spot exchange market as they became available and would refrain from using the forward exchange market to support the Rand if it came under pressure.

Figure 4-7 Daily Nominal Effective Exchange Rate of the Rand



Source: SARB, 2003:38

SARB (2003:38) further explains that, the still paltry gross and net value of the foreign exchange reserves (at US\$12,4 billion and US\$7,5 billion respectively at the end of December 2001) meant that the Bank could not use the reserves to resist a speculative attack on the Rand either. Thus speculators were

presented with a golden opportunity for a one way bet against the Rand – the risk of the Rand appreciating and losing the bet was very small while the expected rewards from winning the bet were very large.

Secondly, the Bank announced in October 2001 that it would enforce more strictly the existing exchange control regulations regarding foreign-currency trading. SARB (2003:38) states that, after the announcement, there was a noticeable decline in turnover volumes in the foreign exchange market. The average daily turnover in the market fell from US\$9,9 billion in the third quarter to US\$8,5 billion in the fourth quarter of 2001. The restriction of the government exchange control had a huge impact on the decline of the trade volume in the market.

According to Hodge (2005:24), in this relatively thin foreign exchange markets, the effect of individual transactions on the exchange rate is magnified considerably. This is quite an interesting observation meaning that under those circumstances there were probably fewer, but high value transactions. Speculative foreign exchange deals aimed at depreciating the Rand would thus have had a much greater chance of success in such an environment, especially as the Bank's announcement may have led those taking an opposing view of the Rand to avoid the market temporarily (SARB, 2003:38). The sharp depreciation of the Rand may have been due to a temporary absence of stabilizing speculation, and led to the withdrawal of portfolio investment. From December 2001, the Rand started to recover. This was the result of the positive trade performance.

4.4.2.5 Rand Appreciation: December 2001 – December 2004

After a period of exchange control, the Rand began to recover since the end of 2001. According to SARB (2003:36), the weighted exchange rate of the Rand, which had declined by 34,4 per cent from the end of December 2000 to the end of December 2001, bounced back by 26,0 per cent from the end of December 2001 to the end of December 2002.

SARB (2003:36) states that, this strengthening of the external value of the Rand coincided with surpluses on the current and financial accounts of the balance of payments of the country. The improvement of the external value of the Rand occurred mainly in the fourth quarter of 2002 when, on balance, the nominal effective exchange rate of the Rand strengthened by 17,8 percent.

Unlike the short and sharp rebound in the Rand following its depreciation in 1996, the recovery of the currency after its low point in December 2001 has now extended for over five years. SARB (2003:37) indicates that, the real effective value of the Rand appreciated sharply by 30,2 percent to December

2002, followed by milder appreciations of 18,6 percent and 4,3 percent to December 2003 and 2004 respectively. As in the second half of 1996, the sharp appreciation of the Rand in 2002 was a recovery from a much oversold position at the end of 2001. Contributing to the Rand's rise was a turnaround on the current account.

Table 4-1 Balance of Payments on Current Account 2001-2002

Seasonally adjusted and annualised
R billions

	2001		2002			
	Year	1st qr	2nd qr	3rd qr	4th qr	Year
Merchandise exports	233,2	277,1	288,5	272,1	295,9	283,4
Net gold exports	29,4	39,6	43,5	46,9	40,2	42,6
Merchandise imports	-221,6	-273,5	-276,0	-276,8	-293,0	-279,8
Trade account	41,0	43,2	56,0	42,2	43,1	46,2
Net service, income and current transfer payments	-43,9	-38,8	-51,4	-44,4	-38,8	-42,9
Balance on current account	-2,9	6,4	4,6	-2,2	4,3	3,3

Source: SARB, 2003:30

SARB (2003:30) explains that, after six years of deficits, the current account balanced in 2001 and recorded a substantial surplus of R7,2 billion in 2002. This was partly due to the continued upturn in the commodity price cycle and partly due to the large competitive edge bestowed on exports and import-substitutes following the depreciation of the Rand in 2001 (production of which tends to lag changes in competitive advantage via the exchange rate).

According to SARB (2003:32), the balance on the financial account also surged in 2002; the main items being the surpluses on net direct and other investment. In addition, outflows from unrecorded transactions, which had been negative every year since 1990, switched to inflows in 2000 and have been on a rising trend since then.

Table 4-2 Balance of Payments on Current Account 2003-2004

Seasonally adjusted and annualised
R billions

	2003			2004		
	Year	1st qr	2nd qr	3rd qr	4th qr	Year
Merchandise exports	256,3	260,7	276,0	286,3	290,7	278,9
Net gold exports	34,2	33,4	33,3	29,7	35,0	32,8
Merchandise imports	-265,0	-278,9	-320,7	-315,7	-334,4	-311,9
Trade balance	25,5	17,2	-9,4	0,3	-8,7	-0,2
Net service, income and current transfer payments	-44,4	-42,3	-42,7	-43,4	-46,6	-44,2
Balance on current account	-18,9	-25,1	-52,1	-43,1	-57,3	-44,4

Source: SARB, 2005:23

SARB (2005:23) indicates that, in 2003 the current account fell back to a deficit and grew rapidly to R25 billion by the third quarter of 2004, as indicated by Table 4-2. The reason is that the stronger Rand resulted in increased imports and a decline in exports. Fortunately, the surpluses on the financial account and the inflows from unrecorded transactions outweighed the current account deficits.

According to Hodge (2005:25), at the end of 2003 the Reserve Bank reached its objective of closing out the oversold forward book. It was thus no longer necessary for the Bank to buy surplus Dollars in the market in this regard. The international liquidity position of the Bank – the extent to which its future foreign currency obligations are met by the foreign exchange reserves - had already turned positive earlier in the year. Thus an important source of instability in the foreign exchange market had been removed and the Bank could further improve its international liquidity position at its leisure. The Bank described its intervention policy in the markets as ‘creaming off’ surplus Dollars when opportune to do so.

Hodge (2005:25) further explains that, given the sustained strength of the Rand, many felt that the Bank should have intervened on a much larger scale, both to build up the gross reserves and to prevent further appreciation – or even to reverse the trend and weaken the Rand. This view can be debated. A strong Rand has many benefits. The Bank accordingly felt that a hands-off policy was best and to let the markets decide the fate of the currency. Intervening on a larger scale would have implied taking sides in the market. This could have created favourable conditions for speculators resulting in a renewed source of instability. Despite the big improvement in the Bank’s international liquidity position, the reserves were still too low to resist a renewed speculative attack on the Rand. The strong Rand perhaps also suited the Bank’s purpose to bring the domestic inflation rate within the 3 – 6 percent inflation target and to keep it there.

During this period, trade performance acted as a major factor to have an impact on the Rand value. When the demand for commodities rose, the Rand became a currency in high demand, which contributed to its appreciation.

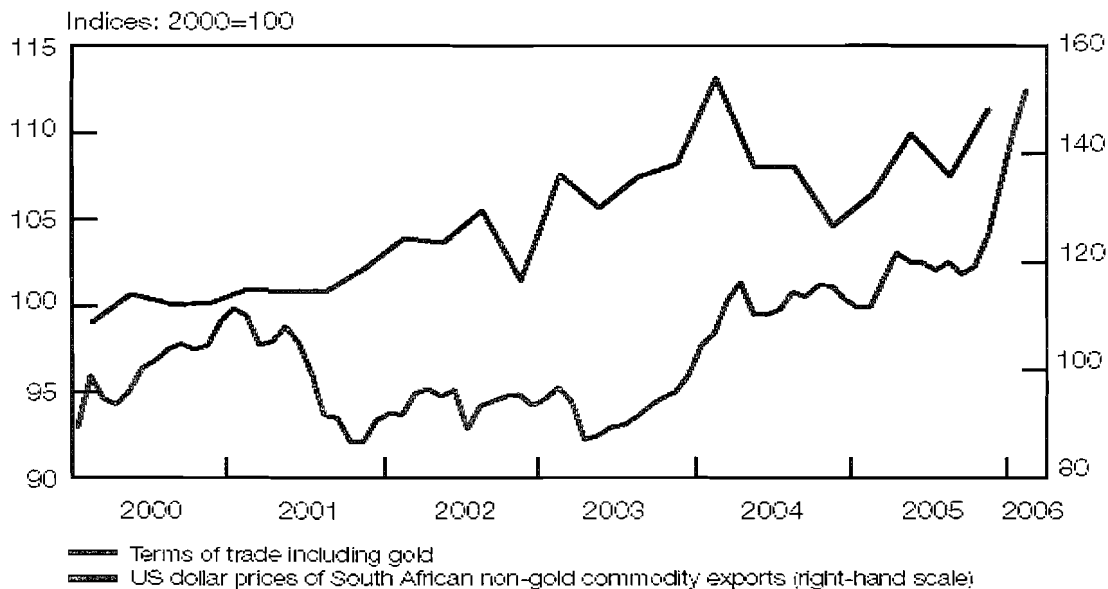
4.4.2.6 Rand Depreciation February 2006 - February 2008

Following three years of significant appreciation, the nominal effective exchange rate of the Rand displayed notable fluctuations during 2005. It declined slightly – by 2 percent – over the course of 2005, having depreciated by 9 per cent during the first half of the year before recovering nearly all the lost ground during the second half. From the end of December 2005 to 28 February 2006, the nominal effective exchange rate of the Rand appreciated

by a further 2,1 per cent. Factors influencing the performance of the Rand over the year included strong commodity prices and a strengthening of foreign direct investment into South Africa (SARB, 2006:32).

According to SARB (2006:33), the real effective exchange rate of the Rand declined by only 0,7 per cent from the end of 2004 to the end of 2005 signaling that, on balance, there was little net change to the international competitiveness of South African exporters. The average daily turnover in the domestic market for foreign exchange, which increased to US\$13,8 billion in the third quarter of 2005, declined to US\$12,0 billion in the fourth quarter. The value of transactions in which non-residents participated decreased from US\$10,2 billion per day to US\$8,8 billion over the same period.

Figure 4-8 Terms of Trade and Commodity Prices



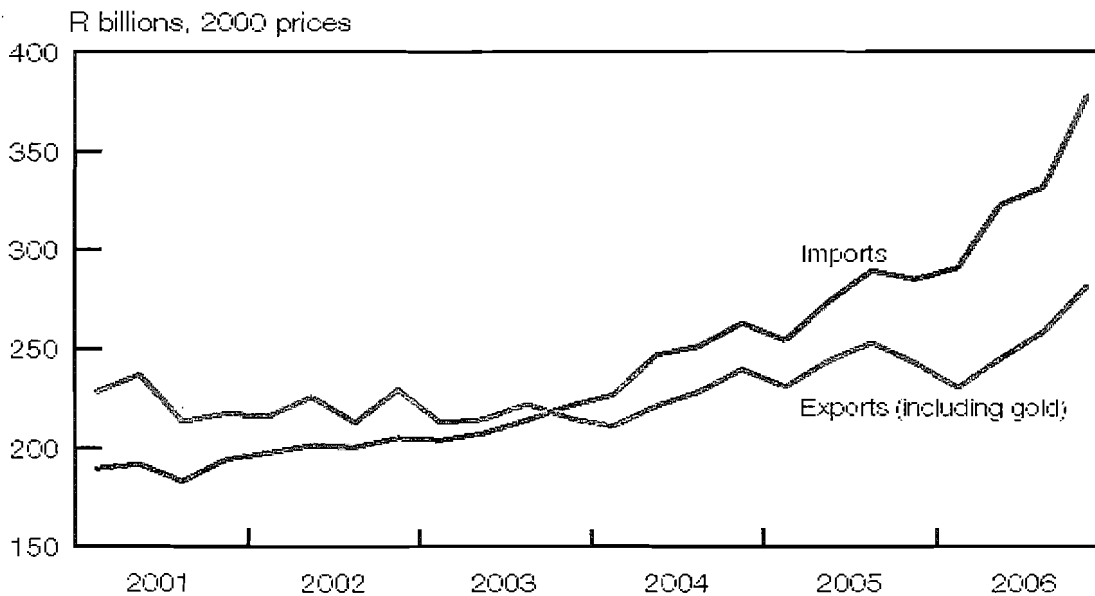
Source: SARB, 2006:33

SARB (2006:33), further reports that, the average daily turnover in the domestic market for foreign exchange which increased to US\$13,8 billion in the third quarter of 2005, declined to US\$12,0 billion in the fourth quarter as indicated in Figure 4-8. The transaction value of non-resident participation decreased from US\$10,2 billion per day to US\$8,8 billion over the same period.

SARB (2007:26) indicates that, after declining by 2,0 per cent in 2005, the weighted average exchange value of the Rand, decreased further by 15,4 per cent in 2006 – the largest annual decline since 2001. It is however interesting to note from Figure 4-9, that during that period of decline in the exchange rate, imports increased dramatically relative to exports.

However, after weakening during the second and third quarters of 2006, the nominal effective exchange rate of the Rand strengthened by 7,7 per cent in the fourth quarter. The rate of increase in the last quarter was more prominent during November and December 2006 when the exchange value of the Rand increased by 3,8 per cent and 2,6 per cent, respectively. The macroeconomic factors which supported the movement in the Rand were, among other things, the higher gold price, weaker US Dollar, widening of the interest rate differential and strong global equity markets.

Figure 4-9 Real Import and Export 2006



Source: SARB, 2007:22

The positive sentiment towards emerging markets turned negative at the beginning of 2007. SARB (2007:27) states that, when the plans for the nationalisation of private-sector assets in certain oil-producing emerging-market economies were announced, and with concerns about the outlook of South Africa's current-account deficit, contributed to the weakening of the Rand during the first two months of 2007. The nominal effective exchange rate of the Rand retreated somewhat at the beginning of 2007, declining by 3,3 per cent in January. While the Rand initially recovered during February, it declined towards the end of the month following a decline in Chinese share prices and increased investor caution towards emerging markets.

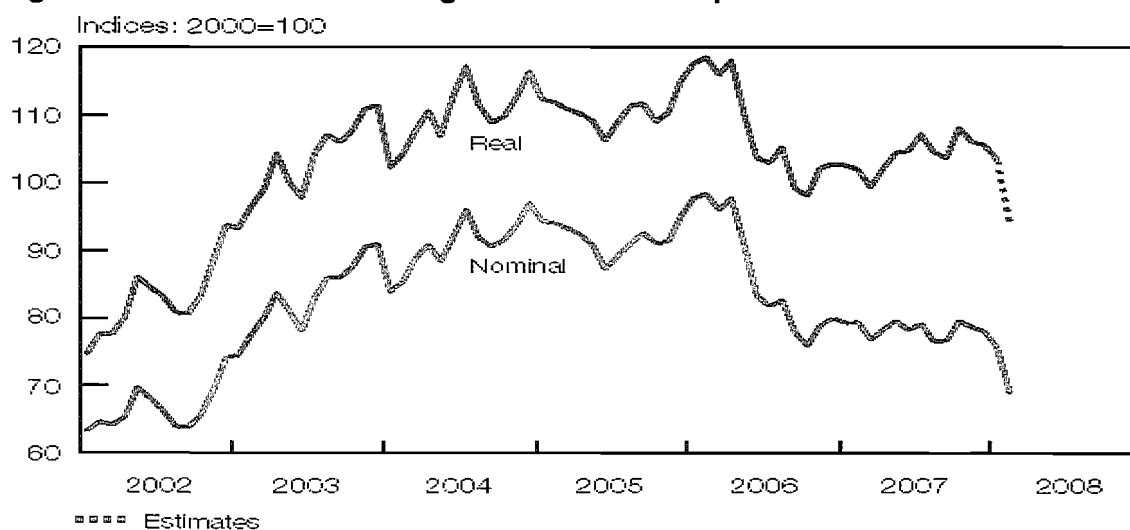
SARB (2007:27) indicates that, the real effective exchange rate of the Rand declined by 10,7 per cent from December 2005 to December 2006, leading to increased profit margins for South African exports in international markets over this period. The average daily turnover in the domestic market for foreign exchange increased marginally from US\$14,5 billion in the third quarter of 2006 to US\$14,6 billion in the fourth quarter as non-resident investors' interest

in the South African equity and debt markets continued its buoyant trend. The value of transactions in which non-residents participated remained roughly unchanged at US\$10,6 billion per day over the same period.

Figure 4-10 shows that, the nominal effective exchange rate of the Rand displayed significant volatility when it registered, according to SARB, (2008:29), an increase of 3,8 per cent and 1,2 per cent in October and December, respectively, while declining by 5,1 per cent during November 2007. On balance, the exchange rate of the Rand decreased by a further 0,4 per cent in the fourth quarter of 2007, mainly reflecting the resilience of the South African economy during the global financial market turmoil and risk aversion which began in August 2007. However, for the 2007 calendar year as a whole, the weighted average exchange rate of the Rand declined, on balance, by 3,5 per cent compared to a decline of 15,4 per cent in 2006.

The decline of only 3.5 per cent during 2007 can be attributed to the fact that the signs of a global economic crisis emerging, started in 2007. This also affected the value of other major currencies, that to some extent, made the value of the Rand appear better.

Figure 4-10 Effective Exchange Rate of Rand up to 2008



Source; SARB, 2008:30

From the end of December 2007 to the end of February 2008, the figures reported by SARB (2008:30) indicate that, the weighted average exchange rate of the Rand declined by a further 13,5 per cent on account of the continuing turmoil in international financial markets and concerns about the supply of electricity which clouded the outlook for exports and economic growth in South Africa. The depreciation was to some extent moderated by exceptionally high prices of precious metals, as well as a sound Budget which was tabled in February.

The dramatic depreciation of the Rand was triggered by the huge current account deficit and the real effective exchange rate in 2007. This part of the theory was explained in section 3.3.2 Balance of Payments approach; section 3.2.1 Real effective exchange rate and in section 3.3.1 Purchasing Power Parity theory.

Since the middle of 2007, the American economy started to show signs of slowing down, this caused the global demand for commodities to decline. This led to the sub-mortgage crisis in United States and immediately spread to the rest of the world. With lost confidence in the global banking sector, portfolio investors withdraw their investments from South Africa. This had the effect of worsening the current account deficit and weakening the Rand. What is ironic, is that although the global financial crisis originated in the United States, other currencies got penalised. Investors apparently continued to believe that during economic uncertainty investing in the Dollar provides some security.

The following table provides a summary of the findings recorded in section 4.4.2.1 to section 4.4.2.6.

Table 4-3 Summary Table

Period	Movement	Main Reasons
January 1996 – November 1996	Depreciation	Current account deficit Rising money supply
November 1996- April 1997	Appreciation	Interest rate differentiation Portfolio investment inflow
January 1998 – July 1998	Depreciation	Asia Crisis Current account deficit Portfolio investment withdraw
June – December 2001	Depreciation	Reduced exchange reserve Enforce exchange regulation
December 2001 – December 2004	Appreciation	Exports increase Portfolio investment inflow
February 2006 – February 2008	Depreciation	Portfolio investment decline Global Financial Crisis

Source: Own research

By 2008, America's sub-prime mortgage crisis brought the global economy into an economic recession. The commodity demand from Europe, Aisa and South Africa decreased dramatically (Budget Speech, 2009:3). With commodity prices generating lower export earnings, it lead to a decline in the demand for Rand. Currently (February 2009) the Rand is at approximately \$1 to ZAR10 level. One could expect the Rand to stay at this level for a few

months, in view of possible political instability during the April 2009 general election.

4.5 Conclusion

In this chapter, studies of the various aspects of the behaviour of the exchange rate of the Rand from 1990-2008 was researched. This is a study that followed the behaviour and determination of the Rand exchange rate discussed in Chapter three. The overall outcome of this chapter indicates that the effect of changes in the exchange rates are influenced mainly by international trade performance, foreign investments and a number of economic indicators such as inflation, interest rates and GDP growth rates.

In describing the behaviour of the exchange rate, three distinctions are made: the level of the exchange rate, volatility in the trend of the exchange rate, and volatility of the exchange rate around its trend. The main concern is with persistent changes in the real level of the Rand, which may imply a macroeconomic misalignment of the exchange rate, and with longer-term volatility or swings in the real exchange rate.

This chapter suggests that the real appreciation of the Rand from its low point in December 2001 to its level at the beginning of 2008 is essentially a recovery from earlier episodes of depreciation. Presently, the real effective exchange rate is at the same level as it was before the speculative attacks on the Rand during the emerging markets crisis in 1998 and the latter half of 2001. Since this exchange rate index is a broad indicator of the competitiveness of manufactured goods in foreign markets, the current level of the Rand does not appear to be overvalued by this measure.

It may be argued that the Rand was, on average seriously overpriced before the emerging markets crisis in 1998; it is, however also difficult to argue that it is overvalued now. Exports of manufactured goods grew steadily in real terms between 1990-97, especially from 1994 as world growth accelerated and commodity prices picked up. Thus the level of the Rand is not uncompetitive relative to its longer-term history. It only appears to be overvalued relative to its shorter-term history since the emerging markets crisis in 1998 when successive speculative attacks on the Rand pushed it to its lows of 2001. This extreme depreciation in the real value of the Rand represented a windfall for exporters due to the large but temporary competitive advantage it gave them in world markets. Thus the recovery of the Rand since then and the elimination of this windfall should not be seen as an overvaluation, but as a long overdue reversion to the mean of the real effective exchange rate.

In 2003 the current account fell back to a deficit and grew rapidly to R25 billion by the third quarter of 2004 as the strong Rand began to bite into exports and imports began to flow in. However, large surpluses on the financial account and the inflows from unrecorded transactions heavily outweighed the current account deficits. This further proved that the terms of trade or Balance of Payment figures have a huge impact on the fluctuation of the Rand.

The real effective exchange rate of the Rand declined by 10,7 per cent from December 2005 to December 2006, leading to increased profit margins for South African exports in international markets over this period. The real effective exchange rate of the Rand increased by 2,7 per cent from the end of 2006 to the end of 2007, suggesting a slight deterioration in the competitiveness of South African exporters over this period. This was more than fully reversed by exchange rate movements in the first two months of 2008.

This study indicated that the exchange rate movements since the 1990s were impacted by a number of factors, such as the macroeconomic indicators, including the inflation rate, interest rate and economic growth rates in South Africa, which are the factors that determine the commodity price level of South Africa and the competitiveness in the international trade and investments. Therefore, this chapter indicates that the currency value or the Rand value in South Africa is mainly impacted by trade and investment between South Africa and the developed countries in the world. Although exchange rate fluctuations can be explained in terms of economic indicators, it remains questionable if accurate predictions of the exchange rate can be made.

Chapter 5

Management of Exchange Rate Risk

5.1 Introduction

Traditionally there have been two views on exchange rates. One holds that the exchange rate is the relative price of two currencies; the other view indicates that it is the relative price of domestic and foreign goods. A third view, takes portfolios into account to suggest that the exchange rate is the relative price of nominal assets. According to Dornbusch (2004:1), there is little sense in any of these partial equilibrium slogans and it becomes readily apparent that in most instances real, monetary and financial considerations interact in the determination of exchange rates.

Dornbusch (2004:38) explains that the exchange rate not only denotes the number of one country's currency that equals one unit of another country's currency, but also a highly visible indicator of confidence in the political and economical policy of a country. For instance, the current exchange rate of the Zimbabwe Dollar in terms of the major currencies in the world indicates the political and economical instability in the country.

Measuring and managing exchange rate risk exposure is an important financial management control in order to reduce the adverse effects exchange rate fluctuations. This chapter reviews the traditional types of exchange rate risk faced by firms, namely transaction, translation and economic risks. It presents the VaR approach as the current predominant method of measuring a firm's exchange rate risk exposure.

It also examines the main advantages and disadvantages of various exchange rate risk management strategies, including tactical versus strategic, and passive versus active hedging. In addition, it outlines a set of widely accepted best practices in managing currency risk and presents some of the main hedging and arbitrage instruments in the over-the-counter (OTC) and exchange-traded markets. The chapter also provides a few examples on the use of financial instruments and hedging practices by South African companies.

5.2 Risk

Before considering risk management, it is necessary to determine what risk is. The term normally carries a negative connotation, but is it something that should be avoided at all cost, or can a certain level of risk be accepted? If risk should be avoided in its entirety, a risk management policy wouldn't be

necessary. It follows that risk management becomes necessary when a certain level of risk is assumed.

There are many definitions of risk. Olsson (2002:5), defines risk as the possibility of adverse consequences happening. According to Alijoyo (2002:3), risk is the chance of something happening that will have an impact upon objectives. ICAEW (2002), in their definition of risk, states that risk is the amount of uncertainty as to the benefits that the business will derive from pursuing its objectives and strategies.

From the definitions it is obvious that risk results from uncertainty. It is: not knowing what will happen in the future. Bernstein (1996), relates risk to time by stating that "if there is no tomorrow there would be no risk." Risk is further, the negative aspect of uncertainty. Only the possibility of an unfavourable future event is regarded as risky. Risk can therefore be defined as: The chance that some unfavourable future event will occur.

In answering the question whether risk should be avoided at all cost, it is stated that unfortunately it is not a viable option. When advancing into the future, unknown territory is entered. There is no memory or definite knowledge of what the future holds. The whole future is therefore a potentially risky existence. That however does not imply that risk only destroys without a positive aspect to it.

Mellars and Gibson (1996), hypothesise that the extinction of Neanderthals resulted from their unwillingness to migrate as Homo sapiens did. By attempting to avoid the risk of leaving the security of their caves, they also avoided development. In contrast, Homo sapiens migrated and encountered new dangers, experiences and opportunities. They had to invent new tools and strategies, but most important is that they had to change their thinking about the future.

Risk is one of the most important factors that contribute towards development. When risky situations occur, new possibilities become evident and improvements can take place. Risk offers opportunities and new resources that can be the driving force for further development. Ignoring risk altogether can lead to destruction. Attempting to avoid risk as the Neanderthals did can also lead to destruction. But by accepting risk as a part of reality, and plan accordingly, can result in development.

5.3 Definition and Types of Exchange Rate Risk

Having looked at risk in general, the focus is now placed on exchange rate risk. The general principle of risk being associated with uncertainty also applies to exchange rate risk.

Madura (1989) states that a common definition of exchange rate risk, relates to the effect of unexpected exchange rate changes on the value of the firm. In particular, it is defined as the possible direct loss (as a result of an un-hedged exposure) or indirect loss in the firm's cash flows, assets and liabilities, net profit, and in turn, its stock market value from an exchange rate movement. This definition of exchange rate risk is in a broad sense equivalent to the general definition of risk stated in 5.2 above. To manage the exchange rate risk inherent in the operations of multinational firms, a firm needs to determine the specific type of currency risk exposure, the hedging strategy and the available instruments to deal with these currency risks.

Halala and Wystup (2002), mention that multinational firms are participants in currency markets by virtue of their international operations. To measure the impact of exchange rate movements on a firm that is engaged in foreign-currency denominated transactions, i.e., the implied value-at-risk (VaR) resulting from exchange rate fluctuations, we need to identify the type of risks that the firm is exposed to and the amount of risk encountered.

Identification of the various types of currency risk, along with their measurement, is essential to develop a strategy for managing currency risk. Most references on exchange rate risk, for example Correia *et al* (2003), refer to three main types of exchange rate risk exposures:

- Transaction risk, relates to potential profits and losses resulting from foreign transactions. Foreign exchange profits or losses arise because the transaction date and the settlement date are different. All currency movements between the two dates will result in a profit or loss. It is mainly sales transactions, purchase transactions, interest payments and dividend payments which have potential exchange rate profits and losses.
- Translation risk, which is basically a balance sheet exchange rate risk and relates to exchange rate fluctuations when converting foreign subsidiaries and investments into the reporting currency when preparing consolidated financial statements. Translation risk for a foreign subsidiary is usually measured by the exposure of net assets (assets less liabilities) to potential exchange rate movements. In consolidated financial statements, according to international accounting practice (IAS 21), the translation is done at the end-of-the-period exchange rate for most balance sheet items

and at the average exchange rate for the period for most income statement items.

- Economic risk refers to changes in the value of a business resulting from long-term exchange rate movements. It is basically the risk to the firm's present value of future operating cash flows from exchange rate movements. In essence, economic risk concerns the effect of exchange rate changes on revenues (domestic sales and exports) and operating expenses (cost of domestic inputs and imports) and the effect it will have on the value of the firm.

If exchange rate changes are influenced by only the current account figures of a country, for example in South Africa, a constant current account deficit indicates that the country exports less than what it imports. It could be the risk of financing import payments in the future. Another example is the inflation differentials, which, through the measurement of the Purchasing Power Parity. Froot and Thaler (1990) mention that, if a firm has a subsidiary that faces cost inflation above the general inflation rate, the firm could find its competitiveness eroding and its original value deteriorating as a result of exchange rate adjustments that are not in line with PPP. Under these circumstances, the firm could best hedge its economic exposure by creating payables (e.g., financing operations) in the currency that the firm's subsidiary experiences in the higher cost inflation (i.e., in the currency that the firm's value is vulnerable).

5.4 Measurement of Exchange Rate Risk

After defining the types of exchange rate risks that a firm is exposed to, a crucial aspect in a firm's exchange rate risk management decisions is the measurement of these risks. Measuring currency risk may prove difficult, at least with regard to translation and economic risk (Van Deventer, Imai, and Mesler, 2004; Holton, 2003).

Knowing that risk is based on uncertainty, an attempt to measure risk would be equivalent to trying to measure uncertainty. To quantify the unknown seems like an impossible task. But as it is also known that risk can't and shouldn't be avoided, but rather be managed, practical measurement tools are required.

The potential risk can be between zero and infinity. Consider the imagined example of a Zimbabwean business that imported goods from the United States of America. Payment for the goods will be in US Dollars, one year after the transaction date. The exchange rate risk exposure could vary between zero, if the Zimbabwean Dollar increased in value against the US Dollar, or it could be very high if the Zimbabwean currency becomes worthless during that

period. For management purposes such a broad range of risk exposure, is certainly not desirable. A more practical approach to currency risk exposure is required.

A widely used and currently predominant method of measuring a firm's exchange rate risk exposure is the Value-at-Risk (VaR) model.

According to Holton (2003) The VaR measure of exchange rate risk is used by firms to estimate the risk of a foreign exchange position resulting from a firm's activities, including the position of its treasury, over a certain time period under normal conditions.

Broadly speaking, Value-at-Risk is defined as the maximum loss for a given exposure over a given time horizon with $z\%$ confidence. The VaR methodology can be used to measure a variety of types of risk, helping firms in their risk management. Papaioannou and Gatzonas (2002) state that, the VaR does not define what happens to the exposure for the $(100 - z) \%$ point of confidence, i.e., the worst case scenario. Since the VaR model does not define the maximum loss with 100 percent confidence, firms often set operational limits, such as nominal amounts or stop loss orders, in addition to VaR limits, to reach the highest possible coverage.

Value-at-Risk calculation

There is not one single method of calculating the VaR. Depending on the number of variables used, different calculations can result in different VaR methods.

Papaioannou (2006:5), refers to some of the more widely-used methods, of which three will be discussed:

- The historical simulation. This method assumes that currency returns on a firm's foreign exchange position will have the same distribution as they had in the past;

The historical simulation is the simplest method of calculation. It is done by looking at historical data and noting the highest losses incurred. This method involves running the firm's current foreign exchange position across a set of historical exchange rate changes to yield a distribution of losses in the value of the foreign exchange position, say 1,000, and then computing a percentile (the VaR).

With a 99 percent confidence level, for example and a 1-day holding period, the VaR could be computed by sorting in ascending order the 1,000 daily

losses and taking the 11th largest loss out of the 1,000 (since the confidence level implies that 1 percent of losses – 10 losses should exceed the VaR). The main benefit of this method is that it does not assume a normal distribution of currency returns, as it is well documented that these returns are not normal but rather “leptokurtic”. Its shortcomings, however, are that this calculation requires a large database and is computationally intensive (Papaioannou, 2006:5).

The disadvantage of the historical simulation is that it places reliance on the past being repeated in the future.

- The variance covariance model. The covariance is a statistical tool that indicates how different variables move together. With this method it is assumed that currency returns on a firm’s total foreign exchange position are always (jointly) normally distributed. The change in the value of the foreign exchange position is therefore linearly dependent on all currency returns.

According to Papaioannou (2006:6), the variance–covariance model assumes that (1) the change in the value of a firm’s total foreign exchange position is a linear combination of all the changes in the values of individual foreign exchange positions, so that the total currency return is also linearly dependent on all individual currency returns; and (2) the currency returns are jointly normally distributed. Thus, for a 99 percent confidence level, the VaR can be calculated as:

$$\text{VaR} = -V_p (M_p + 2.33 S_p)$$

Where:

V_p = the initial value (in currency units) of the foreign exchange position

M_p = the mean of the currency return on the firm’s total foreign exchange position, which is a weighted average of individual foreign exchange positions.

S_p = the standard deviation of the currency return on the firm’s total foreign exchange position, which is the standard deviation of the weighted transformation of the variance-covariance matrix of individual foreign exchange positions (note that the latter includes the correlations of individual foreign exchange positions).

If for example a firm has a total exposure of \$2 million that earned a mean return of 15% with a standard deviation of 24% the VaR will be:

$$\text{VaR} = -2\text{million} [0.15 + 2.33 (0.24)] = -\$1\,418\,400.$$

With the above formula, the variance-covariance model can quickly be calculated. The disadvantage of this method is that it relies on possible unrealistic assumptions of a normal distribution of currency returns as well as a linear combination of the total foreign exchange position. Note, however, that the normality assumption might be relaxed (refer Longin, 2001). When a non-normal distribution is used instead, the computational cost would be higher due to the additional estimation of the confidence interval for the loss exceeding the VaR. Another negative aspect is that the model is based on historical information which will not necessarily repeat in the future.

- Monte Carlo simulation, which assumes that future currency returns, will be randomly distributed.

According to Hertz (1964:99) the application of a Monte Carlo simulation requires three steps:

Making predictions of future variables and decide on the probability of each prediction's occurrence.

Randomly select one prediction for each variable.

Should one therefore decide to make three predictions (optimistic, realistic and pessimistic) for each variable and allocate probabilities of 25%, 50% and 25% respectively to each prediction, a random distribution table of 0 to 99 may be used. Should a figure of 0 to 24 be selected, an optimistic prediction of a specific variable will be selected. A randomly selected figure of 25 to 74 will result in the selection of a realistic prediction.

Repeating the process many times. Some researchers (refer Brigham and Gapenski, 1988:328) recommend that the process be repeated 500 times. A large number of predictions will be made and the average of the total number of predictions will be the final prediction.

Monte Carlo simulation usually involves principal components analysis of the variance covariance model, followed by random simulation of the components. While its main advantages include its ability to handle any underlying distribution and to more accurately assess the VaR when non-linear currency factors are present in the foreign exchange position (e.g., options). Its serious drawback is the computationally intensive process (Papaioannou, 2006:7). The biggest advantage of Monte Carlo simulation is that all possibilities (even remote) are taken into account, making it the method that probably has a closer resemblance to reality than the other methods.

5.5 Management of Exchange Rate Risk

Exchange rate risk management forms part of a business's total risk management, which is in turn one of the functions of financial management. The purpose of exchange rate risk management should therefore have it as an objective to maximise returns and prevent or reduce losses.

According to the second law of thermodynamics there is natural tendency from order to disorder. Capra (1996:47) points out that any "closed" physical system will proceed spontaneously in the direction of ever increasing disorder. The foreign exchange market is not a closed physical system, but it doesn't mean it is immune to the disorder implicated by the second law of thermodynamics. As an open system it can maintain a position of order, but that will require active management. Risks, if not managed in order to avoid their impact, are capable of resulting in disorder.

5.5.1 Exchange Risk Management Methods

With risk management techniques, an attempt is made to gain information in support of a present decision that will have future consequences. Four methods whereby some degree of certainty regarding the unknown future can be obtained have been identified. These four methods are: flexibility, predictions, arbitrage and hedging.

5.5.1.1 Flexibility

Flexibility is the ability to rapidly change as circumstances change. When Marie Antoinette told the people to eat cake if they don't have bread to eat, she had flexibility in mind. When confronted with a risk, flexibility should allow a business to avoid it, or reduce its impact. Philosopher Rene Descartes understood the principle of flexibility well when he said in his discourse that he chose the most moderate option among different options, so that he wouldn't stray too far from the true road. With reference to foreign currency transactions, Correia et al (2003:19.24) refers to Currency of Invoice and Leads and Lags, which are examples of flexible behaviour that will reduce foreign currency exposure.

If a business is able to choose the currency of invoice, foreign exchange risk can be eliminated. By insisting that all foreign transactions are denominated in the local currency, the currency risk is transferred to the foreign party.

When a currency is following a trend in a particular direction, leads and lags, if a business is capable of employing it, can reduce exchange rate risk. Leads and lags refer to the ability to slow-down or advance receipt and payments. If,

for example, the currency of a foreign creditor is expected to weaken against the local currency, payment will be deferred until a better rate is obtained.

Although flexibility has definite benefits in managing exchange rate risk, it is unfortunately not always available. During business negotiations, flexibility is often forfeited in favour of service and price.

5.5.1.2 Predictions

In Chapter three, under exchange rate determination, the theory of how one currency is related to another, was discussed in detail. Accurately forecasting currency values is however a totally different topic.

It goes without saying that accurate predictions of exchange rate movements will benefit and simplify exchange rate risk management. Many future problems and risks can be avoided if the future is known. Attempts to obtain a glimpse of the future have over the centuries included occult activities as well as various forecasting techniques.

Apart from a spot exchange rate, banks also quote a forward exchange rate. A question that jumps to mind is, whether a forward rate is an approximation of the future spot rate? Unfortunately the answer is: No. Bansal and Dahlquist, (2000) and Fama, (1984) have also pointed out that it has been well-documented that forward rates are poor predictors of future spot rates.

Forward exchange rates are determined by banks as part of their hedging strategies. For example, if a bank has a commitment under a forward exchange contract to buy US Dollars in three months time, it will now borrow Rand and buy Dollars at the spot rate. The Dollars will be invested in the United States until the contract becomes payable. It will then sell the Dollars at the spot rate and buy the Dollars in terms of the contract. The forward exchange rate will therefore be determined with reference to the local interest rate at which it borrowed the Rand and the foreign interest rate at which it invested the Dollars. Forward exchange rates are fixed in terms of interest rate parity, or the relationship between interest rates. Actual future spot exchange rates are determined by many other economic variables.

Forecasting techniques include scientific models as well as non-scientific methods. The non-scientific methods are generally based on opinions, such as the Delphi technique. The problem with the non-scientific methods is that they are opinions, based on experience and perceptions. They may work well in isolated cases for short-term predictions, but don't provide consistent accurate results.

Various econometric and statistical forecasting models are what can be called scientific forecasting techniques. Most of these models have a sound theoretical base, but unfortunately also have shortcomings. The shortcomings result from the inability of the models to contain all relevant information. They also assume that the past is a good predictor of the future. As it was shown in Chapter four, there are many variables that can influence exchange rates. Each of these variables is in turn affected by many other variables. There are also variables that have a potential influence on exchange rates that is unknown until they take effect. Scientific models may provide accurate results for short periods under stable economic conditions, but fail when the economic environment changes. There are just so many variables, some of them unknown that a single forecasting model can't provide consistent accurate results.

The unreliability of predictions have been emphasised by many researchers: "Prediction isn't the essence of science. The essence is comprehension and explanation." (Waldrop, 1992:255). "There is no predictability, the system never is in the same place twice." (Wheatly, 1994:21).

Due to unreliability, making predictions of future exchange rates does not appear to be a feasible approach for exchange rate management purposes.

5.5.1.3 Arbitrage Based Approaches

Arbitrage is when an opportunity for profit making exists when the same commodity or instrument is traded in different markets and priced differently. By buying in one market and selling in another market the arbitrageur hopes to gain. In economics and finance, arbitrage is the practice of taking advantage of a price differential between two or more markets. Opposing transactions in the different markets profit from the imbalance in the markets., An arbitrage is a transaction that theoretically does not involve any negative cash flows. A profit is therefore guaranteed. The term is mainly applied to trading in financial instruments, such as bonds, stocks, derivatives, commodities and currencies. However, the speed to which world markets react to new information, normally prevent firms from profiting from arbitrage.

Arbitrage transactions in foreign exchange is really money market transactions. But because the money market transactions are in different currencies, exchange rates play a major role. If, for example interest rates in South Africa are higher than in the United States, it seems logical to borrow money in the United States and invest the money in South Africa. In order to eliminate uncertainty, forward cover is then taken out to provide for the transfer of the capital amount and interest back to the United States. The transaction will only be profitable if the difference in interest rates is higher

than the premium paid on the forward exchange contract. The interest rate parity is therefore a major determinant in the success of arbitrage transactions.

If the market prices do not allow for profitable arbitrage, the prices are said to constitute an arbitrage equilibrium or arbitrage-free market. An arbitrage equilibrium is a precondition for a general economic equilibrium.

Approaches such as Purchasing Power Parity and Balassa-Sameulson that explain exchange rate fluctuations have already been discussed in Chapter three. For arbitrage purposes, it is not really the movement in exchange rates that are important, but as indicated above, the difference in interest rates or Uncovered Interest Parity (UIP).

The theory of UIP is the capital market analogue to PPP. This theory has been explained in detail in Chapter 3-3.3.1 Purchasing Power Parity and Chapter 4-4.3.1.3 Exchange Rate and Interest Rate. In this section UIP will focus on applying the theory for arbitrage purposes.

UIP is formulated by Correia et al (2003:19.10) as follows:

$$(1 + F)/(1 + S) = (1 + r)/(1 + r_f)$$

where:

F = forward exchange rate

S = spot exchange rate

r = domestic interest rate

r_f = foreign interest rate

The direct relationship between interest differential and the future and spot rate is evident from the above formula.

As explained by Stephens (2004:3): If interest rates in South Africa are higher than similar interest rates in Europe, investors should expect the South African currency to depreciate. Otherwise investors will be motivated to purchase South African assets, thereby driving the South African spot exchange rate up or, alternatively driving interest rates down.

In an analysis of empirical study research on selected conditions of uncovered interest parity, Moosa and Bhatti (1997) came to the conclusion that UIP had been rejected by studies in various forms. One difficulty with measuring the effect of UIP on the exchange rate, using short-term interest rates, is that unobservable expectations of future interest rate differentials may be important.

It can also be stated that a deviations from UIP provide arbitrage opportunities, it can therefore be expected that UIP deviations will be for very short time periods.

Under efficient economic conditions where the market almost immediately reacts to new information, opportunities for arbitrage gains are rare. The small profit margins would also be absorbed by transaction costs. Arbitrage is therefore more speculative in nature than an exchange rate risk management approach.

5.5.1.4 Hedging

A very effective way to manage risk is to take out insurance cover against the occurrence of specified risks. By taking out insurance, the risk is transferred to another party at a price.

In financial markets, the “insurance” is called hedging and is basically doing something (buy or sell) in one financial market and simultaneously doing the opposite in another, but related financial market. A loss in one market will then be offset by a profit in the other market. In hedging transactions the other related market is usually the derivative market. A derivative is so called because it “derives” its value from an underlying instrument traded in the primary market.

International Accounting Standards (IAS 39:9) defines a derivative as:

A derivative is a financial instrument or contract with all three of the following characteristics:

1. its value changes in response to the change in a specified interest rate, financial instrument price, commodity price, foreign exchange rate, or other variable,
2. it requires no initial investment or an initial investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors,
3. it is settled at a future date.

A derivative, although being traded in another market, is related to the underlying instrument in that price changes are caused by the same economic conditions.

After questioning some businesses people, it became apparent that they want to manage their businesses with certainty as far as possible. They are not interested in “gambling” in the foreign exchange market and therefore prefer

to always hedge against transaction risk. As hedging provides a practical solution to exchange rate risk, the next section will examine hedging as a risk management method.

5.5.2 Hedging Strategies

Transaction risk refers to transactions where payments and receipts are expected to be settled over the short term. Transaction risk is therefore often hedged tactically (selectively) or strategically to preserve cash flows and earnings. A hedge is for a specific transaction. Passive hedging, is the maintenance of the same hedging structure and execution over a hedging periods. This type of hedging strategy is not for a specific transaction, but is maintained if there is a continuous exposure to exchange rate risk.

Translation, or balance sheet, risk is a long-term risk that can affect the presented values of assets and liabilities. Marrison (2002); Jorion and Khoury (1996) point out that within the framework of hedging the exchange rate risk on a consolidated balance sheet, the issue of hedging a firm's debt profile is also of paramount importance. The currency and maturity composition of a firm's debt determines the susceptibility of its net equity and earnings to exchange rate changes. To reduce the impact of exchange rates on the volatility of earnings, the firm may use an optimisation model to devise an optimal set of hedging strategies to manage its currency risk. Hedging the remaining currency exposure after the optimisation of the debt composition is a difficult task.

The risk doesn't affect the daily cash flows of a group and have little effect on the profit. It is therefore hedged very infrequently and non-systematically. When hedged, a passive hedging approach can be sufficient. Foreign assets and liabilities can serve as a natural hedge where gains and losses offset each other.

Economic risk is a long-term risk. It reflects the potential impact of exchange rate movements on the present value of future cash flows. The risk does not have an effect on daily cash flows or profits. The risk is however real, as pointed out by Froot and Thaler (1990), when they stated that, if exchange rate changes follow inflation differentials (through PPP) and a firm has a subsidiary that faces cost inflation above the general inflation rate, the firm might find its competitiveness eroding and its original value deteriorating as a result of exchange rate adjustments that are not in line with PPP. The effect of the risk may happen in the distant future, making it very difficult to hedge. Finding the appropriate hedging tool may also prove to be difficult. Natural hedges and a passive hedging approach may be the most effective.

According to Kritzman, (1993) sophisticated corporate treasuries, are developing efficient frontiers of hedging strategies as a more integrated approach to hedge currency risk. An efficient frontier is a cost/ benefit approach in that it measures the cost of the hedge against the degree of risk that is hedged. With an efficient frontier the most efficient hedging strategy in terms of cost is selected.

The type of risk determines the hedging approach. The matter can however be complicated. With transaction risk, the risk can be clearly identified and a direct and appropriate hedging strategy can be followed. With translation and economic risks, identifying the impact of the risks is clouded by uncertainties. Natural hedges should normally be the safest option with translation and economic risks.

5.5.3 Hedging Benchmarks and Performance

The purpose of a hedge is to provide protection against the adverse affects of risk. In order to be successful it should be effective. It implies that the effectiveness of a hedge should be measured. Jacque (1996) states that; hedging performance can be measured as a deviation from a given benchmark rate. It can be expressed as a VaR number that will be consistent with the performance measure. When being exposed to a single currency exposure, hedging optimisation models, as methods for optimising hedging strategies for currency-denominated cash flows, can help to find the most efficient hedge for individual currency exposures.

An effective strategy is where the lowest possible effective hedge rate for an acceptable level of uncertainty is selected. The economic principle of the highest output for the lowest input also applies to hedge effectiveness. For example, when the firm's currency risk includes volatility, options allow for a hedge rate that reduces uncertainty. Also when the local currency has a relatively high yield and low volatility, options can also generate a better effective hedging rate than forward hedging.

In measuring the effectiveness of hedging the guidance given by International Generally Accepted Accounting Practice can be followed. In order to apply hedge accounting, the effectiveness of a hedge should be determined. According to IAS (39:AG105): A hedge is regarded as highly effective only if both the following conditions are met:

- At the inception of the hedge and in subsequent periods, the hedge is expected to be highly effective in achieving offsetting changes in fair value or cash flows attributable to the hedged risk during the period for which the hedge is designated. Such an expectation can be demonstrated in

various ways, including a comparison of past changes in the fair value or cash flows of the hedged item.

- The actual results of the hedge are within a range of 80-125 per cent.

Risk management also incorporates setting objectives. As part of the currency risk management policy, firms can use budgets or hedging benchmarks as objectives to better manage their hedging strategies.

5.5.4 Hedging and Budget Rates

It has already been noted that a forecasting is not an effective exchange rate risk management tool. Budgets, on the other hand is not a forecast, but a determination of the exchange rate that a business would be comfortable with within its costing and pricing parameters. Madura (1989) mentions that budget exchange rates provide firms with a reference exchange rate level. After deciding on the budget rate, a suitable hedging instrument that will achieve the stated objectives will be selected.

In establishing budget exchange rates different practices may be followed. Some, according to Lam (2003) use PPP rates on which a budget is based. Others may decide to use the average exchange rate for the same period in the previous financial year as suggested by Barton, Shenkir, and Walker (2002). It makes sense that the timing and extent of hedging coincides with the business cycle of the particular industry.

If a business imports a substantial portion of its inventory and sells its goods at a predetermined mark-up, it becomes very important to have a budgeted exchange rate, especially if selling prices are to be fixed for a period. This is emphasised by Papaioannou, (1989) who states that, setting budget exchange rates is also crucial for a firm's pricing strategy. It then becomes very important to hedge against deviations from the budgeted rate.

The volatility of the currency and the period that needs to be hedged will to a large extent determine the method used to decide on a budget rate and also the selection of the hedging instrument.

5.5.5 Hedging Instruments for Managing Exchange Rate Risk

A hedging instrument is according to IAS 39: a designated derivative or a designated non-derivative financial asset or liability whose fair value or cash flows are expected to offset changes in the fair value or cash flows of a designated hedged item. Normally a hedging instrument is a financial instrument (derivative) that derives its value from the underlying hedged item,

but trades in another market. Hedging advantage is then obtained by having an opposite position in the derivative market. A loss (profit) in one market is then offset by a profit (loss) in the other market.

Hakala and Wystup (2002); Jacque (1996); Shapiro (1996) mention that within the framework of a currency risk management strategy, the hedging instruments allowed to manage currency risk should be specified. The available hedging instruments are enormous, both in variety and complexity, and have followed the dramatic increase in the specific hedging needs of the modern firm. These instruments include both Over-the-Counter (OTC) and exchange-traded products.

The basic hedging instruments available for exchange rate risk are: natural hedges, futures and forwards, options and swaps. These instruments will be discussed in detail below:

Natural hedge

A natural hedge is most suitable for translation risk. According to Correia *et al* (2003:18-10) natural hedging occurs when opposite positions are taken in the market through the normal course of business. Natural hedges can be obtained by matching currency inflows and outflows in the same period and by offsetting payables and receivables. A company with a foreign subsidiary or other investment may obtain the benefit of a natural hedge if it also has a similar foreign currency designated liability of an equal amount. Currency fluctuations are then automatically set off.

A natural hedge can be cheaper than other forms of hedging. It is normally not necessary to transact through a broker and an exchange who charges transaction costs. Madura, (1989) advises that natural hedging should first be considered as currency hedging is often costly.

Although suited for translation risk, a natural hedge can also provide a hedge against transaction risk if the business is both an importer and exporter in the same currency. With foreign investments, a natural hedge can also provide an effective hedge against economic risk.

Futures and forwards

A future and forward contract is similar in principle, except that a future contract is a standardised contract on a formal exchange agreement. A forward contract is not standardised and is often traded Over-the-Counter (OTC).

A future (and forward) contract according to Correia *et al* (2003:18-6) (and all other references on the topic) is a commitment to buy or sell an asset on a specified future date at a specified price. Foreign currency can therefore be bought at a specified price for delivery at a future date. A future contract has the advantage that it initially requires no cash investment (except for a margin deposit). A very big investment can be obtained at no cost. Futures are very risky investments for speculation purposes because the investor becomes liable for the losses on the big investment, but can be very suitable for hedging purposes. A future contract is a firm commitment, but an investor can close his position at any time by selling or buying an opposite, but similar position.

Papaioannou, (2006:11) warns that, the high cost of forward contracts and the risk of the exchange rate moving in the opposite direction are serious disadvantages. This will only be the case if future contracts are not used as hedging instruments, but for speculation.

The only foreign exchange future contract traded in South Africa by the South African Futures Exchange (SAFEX) is the Rand/Dollar contract which is a contract based on the exchange rate between the SA Rand and the US Dollar with a contract size of \$100 000. The size of the SAFEX future contract and the fact that it can only provide a hedge against fluctuations in the Rand/Dollar exchange rate, does not make it a suitable hedging instrument for most businesses that want to hedge against transaction risk. The most widely used hedging instrument for foreign currency exposure used in South Africa is a Forward Exchange Contract (FEC).

A forward exchange contract is similar in nature to a foreign exchange future contract; but it may be specified for any amount in any currency. Forward exchange contracts are not traded on an exchange, but are negotiated with the commercial bank of the business. The size of the contract and the delivery date is tailored to individual needs. It makes forward contracts more flexible than future contracts.

With a FEC, foreign currency is purchased from the bank, or sold to the bank, at a predetermined price for delivery at a future date. Although the FEC price carries a premium above the spot rate, the risk of foreign currency exposure is eliminated in that the business knows exactly what the monetary value of the transact in Rand terms will be.

Options

An option is in certain respects similar to a future in that an instrument is bought or sold at a predetermined price for delivery at a future date. With

future contracts, it is required that both parties honour the agreement, but with options one party may decide whether he wants to exercise his option or not. For that privilege of having a choice, a premium is paid.

In theory, options make good hedging instruments. The accepted definition of an option is that an option gives the holder the right to buy or sell an underlying instrument at a specified price within a specified period of time. The right to buy is a call option and the right to sell is a put option. The holder of the option may decide whether he wants to exercise or not, depending on the actual movements in the exchange rate. It must be taken into account that the option premium is an additional transaction cost.

In practice, foreign currency options are not widely used in South Africa. The only traded option contract is a Rand/Dollar option contract with a contract size of \$100 000 traded on SAFEX.

Swaps

According to King (1999:315), swaps are contracts where two parties agree to swap streams of future periodic payments. The most common type of swaps is interest swaps where one party, paying interest at a fixed rate, swaps the interest payments with another party that pays interest at a variable rate. Foreign currency swaps are different from interest rate swaps in that the parties not only swap the interest payments but also the underlying asset or liability. A cross-currency coupon swap is when a currency swap is bought and at the same time interest at a fixed rate is paid and interest at a floating rate is received. A cross-currency basis swap is when a currency swap is bought and at the same time interest at a floating rate is paid in one currency and interest at a floating rate is received in another currency. With currency swaps a combination of currency fluctuations and interest rate fluctuations determine the value. The effectiveness of a currency swap purely for exchange rate hedging is therefore questionable.

Currency swaps are not traded on an exchange but are negotiated Over-the-Counter with banks. Currency swaps may be used as effective hedges against currency and interest rate fluctuations for translation risk, but are not commonly utilized as a hedge against transaction risk.

In conclusion, companies can choose various hedging instruments to manage exchange rate risk exposed in the foreign exchange market. It would to some extent be based on the type of the risks a company is exposed to: transaction risk, translation risk and economic risk. A factor to consider is the cost of hedging compared to the desired benefit.

There are various hedging instruments in the financial market for the purpose of managing and hedging exchange rate risks. The characteristics, advantages and disadvantages of the different hedging instruments have been discussed above. Companies should analyze the different hedging instruments closely before making decisions on which type of product is most suitable to hedge its exchange rate risk.

As indicated above, forward exchange contracts, especially as a hedging instrument against transaction risk, provides the most practical solution.

5.5.6 Risk Management Policies of Companies Quoted on the JSE

Following the previous section on hedging instruments, a few examples of how South African companies manage their exchange rate risks are given below. The shares of these companies are listed on the Johannesburg Securities Exchange (JSE).

New Corpcapital Limited (An investment company)

“The group undertook certain transactions denominated in foreign currencies which have exposure to exchange fluctuations. The group manages exchange rate exposures using forward exchange contracts (and natural hedges).” (*New Corpcapital Limited annual financial statements for the year ended 31 August 2007, note 24.*)

The company makes use of forward exchange contracts and natural hedges to manage exchange rate risk. As it is an investment company, one would expect opportunities exist for natural hedges.

Brait Societe Anonyme (An international investment and financial services group)

“The group utilises derivatives to hedge the tangible capital of its non-US Dollar subsidiaries into its presentation currency. It does this by means of foreign currency call options and forward exchange contracts.” (*Brait Societe Anonyme annual financial statements for the year ended 31 March 2007, note 14.*)

It is interesting to note that this company, which is a financial services group, apart from forward exchange contracts, also utilises call options as a hedging instrument. The options are probably used as a hedge for investments in foreign subsidiaries while the forward exchange contracts are used for foreign currency transactions.

AECI Limited (A chemical company)

“Fair value hedges have been recognised by a subsidiary company for its net exposure to foreign currency. Forward exchange contracts have been designated as hedging instruments in respect of amounts in US Dollars.

The group has hedged its foreign currency exposure on the import of plant and equipment by a subsidiary company, by entering into forward exchange contracts for the purchase commitments.” (*AECI Limited annual financial statements for the year ended 31 December 2007. note 28.*)

This company utilised forward exchange contracts as a hedge for fair value as well as cash flow foreign currency exposure.

Pick n’ Pay Stores Limited (A retail company)

“The group is exposed to foreign currency risk through the importation of merchandise. The risk is covered by entering into forward exchange contracts.” (*Pick n’ Pay Stores Limited annual financial statements for the year ended 29 February 2008. note 29.*)

The group’s exposure to foreign exchange risk is mainly a cash flow risk resulting from foreign currency transactions, and utilises forward exchange contracts as a hedge.

Allied Technologies Limited (A telecommunications company)

“Forward exchange contracts are used as a means of reducing exposure to fluctuations in foreign exchange rates.

The group incurs currency risk as a result of transactions which are denominated in a currency other than the group entity’s functional currency in respect of purchases and sales.” (*Allied Technologies Limited annual financial statements for the year ended 28 February 2007. note 16*)

The group utilises forward exchange contracts as a hedge against foreign currency transaction.

To summarise: forward exchange contracts appear to be a popular hedging instrument for South African companies when managing the foreign currency risk. This is probably because entering into forward exchange contracts are a relatively easy (and effective) procedure for the effective hedging of exchange rate risk exposure.

5.6 Best Practices for Exchange Rate Risk Management

Allen (2003) and Jacque (1996) emphasise that for their currency risk management decisions, firms with significant exchange rate exposure often need to establish an operational framework of best practices. These practices or principles may include:

- Identification of the types of exchange rate risk that a firm is exposed to and measurement of the associated risk exposure. As mentioned before, this involves determination of the transaction, translation and economic risks, along with specific reference to the currencies that are related to each type of currency risk.
- Development of an exchange rate risk management strategy. After identifying the types of currency risk and measuring the firm's risk exposure, a currency strategy needs to be established on how to deal with these risks. Taking the overall objectives into account, decisions on which hedging instruments will be used for which hedged items must be made.
- Creation of a centralised entity in the firm's treasury to deal with the practical aspects of execution of exchange rate hedging. This entity will be responsible for exchange rate forecasting, the hedging approach mechanisms, the accounting procedures regarding currency risk, costs of currency hedging, and the establishment of benchmarks for measuring the performance of currency hedging. Depending on the authority delegated to this entity by the board of directors, this entity may have final decision making powers or not.
- Development of a set of controls to monitor a firm's exchange rate risk and ensure appropriate position taking. Since the prices of instruments traded on financial markets are made available on a daily basis, it is possible to monitor effectiveness on a daily basis. The controls will include stop-loss settings, comparing positions to benchmarks and position limits.
- Establishment of a risk overview committee. This committee should ensure quality and prudence in decision making. It would in particular approve limits on position taking, examine the appropriateness of hedging instruments and associated VaR positions, and review the risk management policy on a regular basis. Managing exchange rate risk exposure has gained prominence in the last decade, as a result of the unusual occurrence of a large number of currency crises. Van Deventer, Imai, and Mesler (2004) state that, currency risk management is increasingly viewed as a prudent approach to reducing a firm's vulnerabilities from major exchange rate movements.

International accounting practice (IAS, 39) requires a hedging relationship in order to qualify for hedge accounting.

In order to qualify for hedge accounting, the following conditions must be met (IAS, 39:88):

- At the inception of the hedge there is a formal designation and documentation of the hedging relationship and the entity's risk management objective and strategy for undertaking the hedge. That documentation shall include identification of the hedging instrument, the hedged item or transaction, the nature of the risk being hedged and how the entity will assess the hedging instrument's effectiveness.
- The hedge is expected to be highly effective in achieving offsetting changes in fair value or cash flows attributable to the hedged risk.
- For cash flow hedges, a forecast transaction that is the subject of the hedge must be highly probable and must present an exposure to variations in cash flows that could ultimately affect profit or loss.
- The effectiveness of the hedge can be reliably measured.
- The hedge is assessed on an ongoing basis and determined actually to have been highly effective throughout the financial reporting periods.

As can be seen from the above, accounting practice requires a hedging strategy to be adequately planned, managed and controlled. Without planning, monitoring and control, what is supposed to be a hedging strategy, can easily become pure speculation.

The importance of having a hedging strategy and a risk overview committee cannot be over emphasised. Extensively reported in the press was the failure of Barings Bank in 1995. One of the oldest and prestigious banks in the UK, became bankrupt within days after speculation losses in derivatives incurred by trader, Nick Leeson. Derivatives, being useful tools in risk management can have disastrous results if used incorrectly. An adequate and controlled policy on risk management and the use of derivatives by the bank could have prevented a disaster.

5.7 Responsibility for Exchange Rate Risk Management

The King II Report on Corporate Governance (2002), specifically states that the Board of directors has overall responsibility for risk management and internal control. Although the directors have final responsibility, the Board of

directors can establish a risk management committee to specifically manage risk within the constraints of a policy document approved by the Board.

Risk management is therefore not the task or responsibility of a single person. Within Corporate Governance, risk management is regarded to be so important that the highest governing body in a business, the Board of directors, have ultimate responsibility. It will be required of the Board to have a direct and committed role in the management of risk.

5.8 Conclusion

Measuring and managing currency risk exposure are important functions in reducing a firm's vulnerabilities from major exchange rate movements. These vulnerabilities mainly arise from a firm's involvement in international operations and investments, where exchange rate changes could affect profit margins, through their effect on sources for inputs, markets for outputs and debt, and the value of assets. Prudent management of currency risk has been increasingly mandated by corporate boards, especially after the currency-crisis episodes of the last decade and the increased international attention on accounting and balance sheet risks.

In managing currency risk, companies utilise different hedging strategies depending on the specific type of currency risk. These strategies have become increasingly complicated as they try to address simultaneously transaction, translation and economic risks. As these risks could be detrimental to the profitability and the market valuation of a firm, corporate treasurers, even of smaller-size companies, have become increasingly proactive in controlling these risks. Thereby, a greater demand for hedging protection against these risks has emerged and, in response, a greater variety of instruments has been generated by the ingenuity of the financial engineering industry.

This chapter presents some of the main issues in the measurement and management of exchange rate risks faced by firms, with special attention to the traditional types of exchange rate risk (transaction, translation, and economic), the currently predominant methodology in measuring exchange rate risk (VaR), and the advantages and disadvantages of various exchange rate risk management approaches, hedging and arbitraging approaches (tactical vs. strategic, and passive vs. active). It also outlines a set of widely-accepted best practices in currency risk management, and reviews the use of some of the widely-used hedging instruments in over-the-counter and exchange traded markets. It also reported on the use of various derivative instruments and hedging practices by some South African public companies.

Chapter 6

Summary and Conclusion

6.1 Introduction

Worldwide exchange rate fluctuations, including the South African currency, have demanded a substantial share of attention from economists and analysts over the last few years. This study examined various aspects of the development of the exchange rate regimes, exchange rate theories, the exchange rate volatilities and the exchange rate risk management strategies for companies involved in international trade and investment,

The research focused on the behaviour of the exchange rate of the Rand from the 1990s up to 2008, as well as the analysis of the reasons or the factors that influence the exchange rate volatility in different periods. This is supported by the exchange rate regimes developed in Chapter two and the theories which relate to exchange rates, exchange rate determinations and the equilibrium exchange theories. An investigation into exchange rate volatility in Chapter five of this study provided some hedging and arbitraging strategies for the management of exchange rate risk.

6.2 Summary

Chapter two of this research provides an overview of different monetary systems and exchange rate regimes. The chapter commenced with a layout of the different exchange rate systems starting with the Gold Standard, the Bretton Woods system, European Monetary system and up to the current international monetary system. Also included are floating exchange rate systems and alternative exchange rate regimes. This is followed by the monetary and exchange rate system in South Africa. Under the international monetary system development background, the four phases and changes that have been experienced by the South African monetary system and the current exchange rate system (free floating with inflation monetary targeting monetary policy framework) have been explained.

In Chapter one it was noted that the first secondary objective is, “to obtain a brief understanding of the development of international monetary regimes”. The research done in Chapter two, complied with this objective by providing a detailed study of each exchange rate regime.

Exchange rate theories were introduced in Chapter three. The basic definition and an explanation of exchange rates, the nominal, real and effective exchange rates, and the demand and supply of exchange rate theories were

discussed. This was followed by the determination of exchange rate theories that included purchasing power parity (PPP), balance of payments (BOP) theory and the asset and portfolio approaches in the determination of exchange rates. The equilibrium exchange rate theory is supported by the Fundamental equilibrium exchange rate theory (FEER), the desired equilibrium exchange rate (DEER) and the National real exchange rate (NATREX). The impact of monetary and fiscal policy on exchange rate movements is also explained through the Mundell-Fleming Model at the end of the chapter.

The second of the secondary objectives stated in Chapter one was, “to identify the exchange rate theories and macroeconomic approaches which have an impact on exchange rate fluctuations”. This objective was met in Chapter three.

An investigation regarding the reasons behind the movements in exchange rates is the topic of Chapter four. The research focused on the behaviour of the exchange rate of the Rand from the 1990s up to 2008. In this chapter, a number of factors influencing the exchange rate volatilities, such as terms of trade, inflation, interest rate and exchange rate, the GDP growth rate and political and economic stability, were explained and discussed.

In the first part of Chapter four the third secondary objective of, “to understand how economic variables will impact the investment and trade activities between South Africa and the developed countries”, was met.

The second part of the chapter focused on the determination of the reasons for exchange rate volatility for different time periods in the South African economy. This part of the study was necessary in order to comply with the primary objective.

Chapter five focused on the management of exchange rate risk. The chapter commenced with the definition and the types of the exchange rate risk, and continued to explain how the exchange rate risk can be measured, mainly through Value-at-Risk calculations. After discussing a number of methods that may be used for Value-at-Risk measurement to measure exchange rate risk, the chapter introduced strategies that may be used to manage exchange rate risk. This included hedging and arbitraging strategies.

The fourth secondary objective was, to “gain an understanding on how companies can use hedging and arbitrage strategies in international trade and investment activities to reduce foreign exchange risks”. In Chapter five this objective has been complied with the study of the exchange rate risk management strategies, including the types, measurements and management

of the exchange rate risks.

6.3 Conclusion

Exchange rates are determined by the strength of one economy relative to the strength of the economies of its trading partners. While perceptions and politics may be perceived as having an effect on exchange rates, it is macro-economic issues that determine the value of currencies. The exchange rate movements since the 1990s were impacted by a number of macro-economic indicators, such as the inflation rate, interest rates and economic growth rates in South Africa. These are the factors or macro-economic fundamentals that determine the commodity prices level in South Africa, and the competitiveness in international trade and investments.

This study further indicated that the currency value or the Rand value in South Africa is mainly impacted by trade and investment between South Africa and the developed countries of the world. The value of the Rand is therefore determined by economic factors having commercial substance. An exchange rate is not merely an economic indicator. It is a real value determined by real market forces with real consequences.

Measuring and managing currency risk exposure are important functions in management in order to reduce a firm's exposure from major exchange rate movements. These exposures mainly arise from a company's involvement in international operations and investments, where exchange rate changes could affect profit margins, through their effect on sources for inputs, markets for outputs and debt, and the value of assets. Prudent management of currency risk has been increasingly mandated by corporate boards, especially after the currency-crisis episodes of the last decade and the consequent heightened international attention on accounting and balance sheet risks.

To conclude the study, the issues relating to exchange rate management became an important concern for economic reform in South Africa due to the rapidly changing global environment. It is important to understand how factors such as inflation, interest rates and a country's GDP growth level will impact the investment and trade activities between South Africa and developed countries. The objective for companies should be to be able to analyse the types of accounting measures used to manage exchange rate risks in order to have an understanding on how companies may use hedging and arbitraging strategies in international trade and investment activities to reduce foreign exchange rate risks.

The primary objective of this study was noted in Chapter one as, "to analyse and gain an understanding of the factors that have a large impact on the

volatility of the exchange rate, and to show that there are a number of economic indicators that should be taken into consideration when exporters, importers and investors make trade and investment decisions". Based on the research, this objective has been complied with.

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2009-09-22

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