AN ASSESSMENT OF THE EXCHANGE RATE POLICY IN MOZAMBIQUE
FOR THE SUSTAINABILITY OF THE ECONOMY DURING 2000 - 2010

BY

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THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EXCHANGE RATE
POLICIES

TO

ZIMBABWE OPEN UNIVERSITY

SUPERVISOR

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2014
ABSTRACT

This study presents an assessment of the exchange rate policy, for sustainability of the economy for Mozambique. The study covers the period (2000-2010). It begins with a review of literature on the exchange rate policy and provides an updated background in the Mozambican economy.

Engle and Granger (2003) cointegration was implemented to identify long run relationships and its equilibrium path with exogenous and endogenous variables. Additionally the study also employed error correction approach to provide strong long run effects and short run dynamic effects on the real exchange rate.

The main findings are that the real exchange rate of Mozambique is determined primarily by government consumption, foreign direct investment, trade restriction, technological and productivity and terms of trade and capital inflow. In particular technological and productivity has more considerable effects on the real exchange rate, 1 percent increase in technological and productivity leads almost to 6.1484 real exchange rate appreciations.

The estimate of the speed adjustment coefficient found in this study indicates a figure of -0.2521. The validation test was conducted using Jacque-Bera test, stability test, autocorrelation and residual test, the regression model responds to the assumption of ordinary least square method (OLS).
The finding shows an evidence of long run relationship existing between real exchange rate and fundamental variables. The study illustrated that the real exchange rate had been overvalued between (2006:3-2008:4) while it has been undervalued for the most periods between (2001:1-2006:2) and consistently undervalued during (2007:1-2010:1). The overvaluation had been characterized by the relative political stability, the removal of sanctions and the integration of the Mozambican economy in the global market.

The study suggested the adjustment in the fiscal policy to return to the macroeconomic stability, policy makers have used discrete nominal devaluation to maintain the competitiveness of the Mozambican exports, maintain the flexible exchange rate regimes because they respond better in case of real shock than other regimes.
ACKNOWLEDGEMENT

I would like to acknowledge various peoples and institutions that have helped me in the drafting of this thesis. Foremost, I wish to express my gratitude to the staff of Central Bank of Mozambique. Many thanks must also go to all staff of Zimbabwe Open University, for their valuables time and for their invaluable comments and advice throughout the progression of the thesis.

I whole heartedly acknowledge to the staff of Central Banking of Mozambique for their unconditional and professional help as well as his support during this thesis. I would like also to extend honest appreciation to my supervisor Dr. Dambudzo, for his inestimable support which led to the successful conclusion of this thesis.

To my dear colleagues Álfandega Manjoro; Armando Tambo and Ibraimo Mussagy, there are no words to express my acknowledgment for all the moments they offered and for their immeasurable and companionship until the final time.

I would like to express my profound gratitude to my family and friends for all their support and encouragement during the compilation of this thesis. A special thanks goes to my loving mother Angelina Mandibodja and all my brothers for the encouragement and the trust they bestowed in me to pursue for a PhD.

Next, I would extend my gratitude to the entire staff of the Catholic University of Mozambique - Faculty of Economics and Management, for all their assistance and help to the completion of the course.
Last but not least, I would like to express my sincere and deepest gratitude to my family; friends and all the people that directly and indirectly helped me conclude successfully this research.
DEDICATION

This work is dedicated to my beloved mother and loving brothers.
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<th>Description</th>
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<tbody>
<tr>
<td>ACF</td>
<td>Autocorrelation</td>
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<tr>
<td>ADF</td>
<td>Augmented Dickey-Fuller</td>
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<td>BM</td>
<td>Central Bank of Mozambique</td>
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<td>CPI</td>
<td>Consumer Price Index</td>
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<td>EB</td>
<td>External Balance</td>
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<td>ECM</td>
<td>Error Correction Model</td>
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<td>EPA</td>
<td>Economic Partnership Agreement</td>
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<td>EREER</td>
<td>Equilibrium Real Effective Exchange Rate</td>
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<td>ERER</td>
<td>Equilibrium Real Exchange Rate</td>
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<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>GARCH</td>
<td>Generalized Autoregressive Conditional Heteroscedasticity</td>
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<td>GC</td>
<td>Government Consumption</td>
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<td>Government Consumption Countries</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>HIPC</td>
<td>Heavily Indebted Poor Countries</td>
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<td>IB</td>
<td>Internal Balance</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<td>INE</td>
<td>National Institute of Statistics</td>
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<tr>
<td>KI</td>
<td>Barrier of Enter</td>
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<tr>
<td>LRER</td>
<td>Long Run Equilibrium Real Exchange Rate</td>
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<td>M</td>
<td>Importable</td>
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<td>MENA</td>
<td>Middle East and North Africa</td>
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<td>MZM</td>
<td>National Currency of Mozambique</td>
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<td>N</td>
<td>Nontradable</td>
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<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>NER</td>
<td>Nominal Exchange Rate</td>
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<td>OLS</td>
<td>Ordinary Least Squares</td>
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<td>PARPA</td>
<td>Program of Alleviation of Poverty Reduction</td>
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<td>Producer Price Index</td>
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<td>Purchasing Power Parity</td>
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<td>PRE</td>
<td>Programa de Reabilitação Econômica</td>
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<td>RER</td>
<td>Real Exchange Rate</td>
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<td>RES</td>
<td>Reserves</td>
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<td>SADC</td>
<td>South Africa Development Community</td>
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<td>TOT</td>
<td>Term of Trade</td>
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<td>TP</td>
<td>Technology and Productivity</td>
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<td>TR</td>
<td>Trade Restriction</td>
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<td>USD</td>
<td>United Stated Dollar</td>
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<td>USA</td>
<td>United States of America</td>
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<td>VAR</td>
<td>Vector Autoregressive</td>
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<td>VAT</td>
<td>Tax of Added Valor</td>
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<td>X</td>
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CHAPTER 1: INTRODUCTION

1.1. Introduction

This chapter provides an impression of the core matter of this thesis, which is the relevancy of the current United Stated Dollar (USD) to fix the economies of the Government Consumption Countries (GCC), initially focusing on the importance of exchange rate policy in general and then to the economic environment. The exchange rate regime which represents the mechanism by which a country manages its currency in respect to other currencies, it has recently been argued that exchange rate policy has had a significant role in determining many macroeconomic outcomes and this has been during reported the past few decades (Frenkel and Rapetti, 2010).

The choice of exchange rate regime is assumed to have some implications for the behaviour of the nominal exchange rate (NER), which is a key macroeconomic variable that influences the behaviour of several other relevant, nominal and real variables such as the inflation rate, the balance of payments, output and employment as well as the rate of economic growth. For example, with respect to inflation rate, movements in NER are assumed to directly affect the price level through the share of traded goods in the consumer basket, and to indirectly affect the level through expectations and aggregate demand. With respect to the expectation channel, the behaviour of NER is assumed to play an important role in affecting inflation expectations and firms price-setting mechanism, particularly in countries with relatively high inflation (Taylor, 2000).
This notion of a competitive Equilibrium Real Exchange Rate (RER) has received more relevance in recent years, particularly in development economics. The rapid recent economic growth in emerging nations such as China, which has been trying to maintain a competitive trade position by continuing to suppress the appreciation of its currency has contributed in this regard. This view has also been supported by a number of empirical studies that have documented significant relationship between competitive RER and higher economic growth, (Razmi et al. 2009).

There is an assumption is that the choice of exchange rate policy is not neutral for economic growth, particularly if it is steered towards maintaining a stable and competitive RER, or at least avoiding overvaluations (Commission on Growth and Development, 2008).

The exchange rate regime can have a significant influence on some key economic policy objectives including price stability, domestic financial stability and robustness, external and internal balances, and economic growth and development. The choice of exchange rate regime gained greater attention in international finance following the collapse of the Bretton Wood system in the early 1970s (Kato and Uctum, 2007).

The regimes of exchange rate are classified by the regulations enacted by the monetary authorities regarding the degree of intervention in the foreign exchange market, and the degree of official commitment in the determination of NER. They have been traditionally divided into two categories: fixed and floating exchange rate regimes.
Fixed exchange rate regimes are normally defined as the commitment of monetary authority to intervene in the foreign exchange market to maintain a certain fixed parity for the currency against another single currency or a basket of currencies. Floating exchange rate regimes are normally defined as the commitment of the monetary authority to entirely leave the determination of the NER to be set by the market forces through supply and demand, fixed and floating exchange rate regimes. There exist others systems that maintain limited flexibility. These are known as intermediate or soft regimes, (Kato and Uctum, 2007).

They include crawling peg, basket peg, adjustable peg, and exchange rate bands. However, there is still no consensus over the optimal exchange rate regime or over the factors that make a country choose a particular exchange rate regime. There is no single exchange rate regime which is right for all countries, or at all times, and the choice of a right exchange rate regime depends primarily on the circumstances of the country in question, as well as on the time, (Frankel, 1999-2003).

Developing countries which have import surpluses and inflationary pressures because of insufficient savings to use indirect taxes on imports and subsidization of exports in order to avoid decline of the balance of trade. If these substitutes for depreciation are included in the net indirect tax component of product at current market the import surplus is likely to be understood and the market price will be upwardly biased. This distortion will be avoided if imports and exports are measured at RER, that is, at official rates plus imports and exports respectively. If the difference between imports and exports is removed from the net indirect tax component of market price, only in this approach will imports and exports become consistent with the other uses and resources
at market prices and can be expressed with them. The year of comparison, the prices of volume index of product at official rate diverges from that of exchange rates to degree that the composition of imports and exports in regards to tax and subsidy (Dornbusch, 1974).

A useful measure of competitiveness is the RER, whose movements are associated with changes in a country balance of trade in goods and non factor services. The RER is usually constructed by deflating the nominal exchange rate, by a price index such as the Consumer Price Index (CPI), Gross Domestic Product (GDP) deflator, export deflator, or cost indices like unit labour cost. The RER is also measured as the relative price of non tradable and tradable goods (Dornbusch, 1974).

Exchange rate problems have engaged core stage in improving economies. In fact, insufficient economic performance of a country has been a result of inappropriate RER. It is now well accepted that while stability in RER promotes export expansion and improved welfare, a permanent depreciations or undervaluation of exchange rate (misalignment) impede exports growth and generate macroeconomics instability. In policy discussions and empirical analysis of the behaviour of the RER in developing countries has been inadequate. In particular, there have been very limited attempts to distinguish formally between the equilibrium real exchange rate (ERER) and the deviation of RER from its equilibrium level (Montiel, 2003).

In any country, exchange rate management or [getting the exchange rate correct] is a challenging macroeconomics policy issue. There has been a broad agreement in the macroeconomic policy in developing countries that the existing objective of exchange
rate policy should be to avoid persistence depreciation or undervaluation of the currency, which are common problems in most developing countries such as budget deficit, higher inflation, current account deficit, low investment, and higher rate of unemployment, such as Mozambique. Nevertheless, in order to manage depreciation, it is necessary to successfully identify what constitutes ERER and this continues to create an essential difficulty in the modern literature on the RER, (Montiel, 2003).

The RER fluctuations can be central effects for the economy, an extended real appreciation may have complex effect on country competitiveness, as the appreciation raises the relative price of domestic goods and provoke expenditures to control from domestic goods towards foreign goods. Domestic output might then be expected to fall in response. Although the domestic tradable goods sector damaged, consumers evidently benefit, on the other hand, a real depreciation may be beneficial to the tradable goods sector and damaging to consumers. The denominated foreign debt of many developing countries is the USD, however, so a real depreciation reflects a true increase in debt servicing costs. These expenditure-switching effects are absent in flexible-price theories (Edwards, 1989).

Exchange rate inconvenience has occupied centre stage in advance of economies management. The inadequate economic performance of various countries has been a result of inappropriate exchange rate. It is now well accepted that while stability in the RER plays an important role through creating appropriate environment for higher rate of investment and exports and affecting competitiveness and profitability of an economy (Edwards, 1989).
Several authors have studied the relationship between variables in the long run as the instrument for economy sustainable and they have tried to estimate the ERER based on standard theories, Purchasing Power Parity (PPP), Balassa-Samuelson and Edwards, Elbadawi and Montiel-Model which say that RER is a function of observable macroeconomics variables and that the actual exchange rate approaches the equilibrium rate over time, (Asfaha and Huda, 2000) and (Eita and Sichei, 2006).

The long run association of variables is a function of real variables only, actual RER responds to both real and monetary variables. The departure of the actual RER from the equilibrium level in the short and medium run are due to the short run inventions and adjustment cost in general. However, positive deviations from the equilibrium level could become persistent through time leading to misalignment (persistent depreciation of exchange rate, consider the floating regimes), Thee literature has found exchange rate misalignment, namely overvaluation exchange rate, as an important forecaster of the currency crisis (Edwards, 1989).

The huge cost of this misalignment imposed in the form of currency crisis makes it impossible for policy-maker to ignore the problem of overvaluation exchange rate which causes reduction on domestic export (Edwards, 1989).
1.2. Background of the Study

The exchange rate is an essential indicator in the economy as it is a relevant instrument in determining the national price level and also it is the main variable that shows the stability in the country's international trade. Additionally, the exchange rate is the variable that influences the rate of the economic growth, (Eita and Sichei, 2006).

The relevance of the exchange rate in the economy of Mozambique, noted that both private or public services in any place in national or external for the most recent policy-maker; Rand or Euro exchange rate, they avail the recent exchange price rates. The report says that the bank interest rate and cost of living or progress of level of price in economy: such information is not pounded, (Annual Report of Central Bank of Mozambique, 2005).

Trade integration in external markets are changing fast over the last four decades, mainly on the macroeconomic indicators, such as Gross Domestic Products, Inflation Rate, Imports and Exports and foreign currency are used with local consumer to buy and sell goods or services. This persistent characteristic of the economy daily increases the relevance of exchange rate on the economy environment and shows the interest for the policy-maker, (Annual Report of Central Bank of Mozambique, 2005).

Mozambican macroeconomic performance since independence has undergone four distinct phases: the decolonization period (1974-1976), characterized by a sharp output reduction without a major external inequality in countries, the period of strict observance to economic growth (1977-1981), in which output returned rather from
earlier decline and internal and external disparity first developed, a period of economic crisis and financial collapse (1982-1986) and finally a period of more lasting recovery (1987-1998), characterized by the recommencement of growth and gradually decline of inflation, and an improvement in the external balance after donations, (National Institute of Statistics-INE, 2004).

The post-independence uncertainty and consequent economic decline, the government, which up to that point had not pursued a systematic transformation of Mozambique into a centrally planned economy, embraced formally Marxism-Leninism and economic planning on Mozambique liberation movement third national congress in February 1977. In year 1981, most large scale economic activities had been brought under the state control during successive period of nationalizations. At the same time, public investment projects reportedly valued about USD 800 million were affected under the direction of the National Planning Commission in Agriculture, Industry, Transport, Communication and Construction, (Annual Report of Minister of Finance of Mozambique, 2006).

The Mozambique economic growth during the period (1977-1981), recovered from its post independence fall was supported by good weather conditions in (1979-1980) after two years of inundates and further stimulated by public investments. However, domestic absorption soon beat capacity constraints, inflation accelerated, exchange rate faced devaluation and an import growth of more than 30 percent per year pushed the current account into large deficit although the country recorded a recovery of export. Affected by a rigorous lack of resources and intensification of a civil war, economic growth in 1981 was contracted sharply in 1982, (Annual Report of Minister of Finance of Mozambique, 2006).
During the civil war, it was becoming apparently clear that state-owned enterprises and farms were facing dwindling budgetary resources and declining productivity, especially in agriculture and public services. More important, from the slight point of view of the sustainability of the debt, it was also becoming clear that the rate of return on investments previously financed by foreign borrowing was insufficient to refund the credits drawn, (Government Report of Mozambique, 2000).

In year 1980, the government of Mozambique responded to the poor performance of the economic conditions with a policy which gives the authority the small activities from private sector in the economic planning as a result of nationalization during the period of independence. After the collapse of the programmes supported by the eastern countries and many problems, such as, cereals deficit, scarcity of consumer goods more generally, lack of equipment to wage the war, and fast-rising debt service payments, (Annual Report of Minister of Finance of Mozambique, 2006).

The credible statistics illustrate that, insufficient public and private service due and actually paid in (1981-1982) was USD 345 million and USD 390 million respectively, the highest annual quantities of money ever paid by Mozambique. The government started a rationing in 1981 and approached the west for financial assistance, (Annual Report of Minister of Finance of Mozambique, 2006).
A series of international requests for food aid, application for membership to the Fund and the World Bank in 1982, and request for its first recognition by the Paris club of creditors, which eventually collapsed in 1984. Meanwhile, the government also took its first steps towards embracing the principles of the market economy at its fourth national congress of Mozambique liberation movement in 1983 (Annual Report of Statistic Institute of Mozambique, 2002).

The limited emergency financial support, however, was not sufficient to avoid an economic crisis that was going far beyond the inability to meet immediate food needs and debt service payment, as evidenced by the government action to constrict the rationing system in Maputo and Beira city in 1983. During the period (1982-1986), local product declined strikingly and current account of balance of payment kept registering enormous deficit; the exchange rate regimes were fixed and devaluated. Meanwhile, inflation remained passive until prices started to be liberalized in 1987, (Annual Report of Statistic Institute of Mozambique, 2002).

In 1986, the National Currency of Mozambique (MZN) was grossly overvalued, and the exchange rate against the USD on the parallel market was nearly 40 times the official rate. However, since 1993, the exchange rate has been market determined. The adjustment of the exchange rate towards market rates proceeded in step. In January 1987, the MZN was sharply devalued from MZN 39 per USD to 202 MZN per USD, and the exchange rate peg was changed from a basket of six currencies to the USD. Devaluations continued at irregular intervals until 1989, when a system of monthly devaluations was instituted, (Annual Report of Minister of Finance of Mozambique, 2003).
In December 1989, the exchange rate peg was changed again to a basket of ten trading partner's currencies. In October 1990, a secondary market for foreign exchange was introduced with market determined exchange rates. After another substantial devaluation in mid 1991, foreign exchange transitions began to be increasingly shifted to the secondary market. In 1992, official and secondary market rates were unified, but a special, more appreciative rate for tied aids was introduced. In June 1993, the special rate for tied aid was abolished, (Annual Report of Statistic Institute of Mozambique, 2002).

From mid (1992-1995), the MZM further depreciated but much more gradually than the previous years. Since 1995, the nominal exchange rate has been relatively stable. The premium between the official and the parallel market rate has been less than 5 percent since October 1996. An inter dealers market was started in 1996 and its operations expanded in 1997. The government response to the economic crisis came in the form of a comprehensive program for economic reforms, the Economic Rehabilitation Program and a number of structural reforms have taken place in Mozambique. Price controls were eliminated, wage determination became the subject of tripartite negotiations, trade was significantly liberalised, and the tariff structure was simplified. Most important, the exchange rate system was substantially modified, (Annual Report of Central Bank of Mozambique, 2006).

These events were likely to have had significant effects on the external competitiveness of Mozambique and presented by the National Assembly in 1987 with the financial support of the Bretton Woods institutions; a rescheduling agreement with the London Club of creditors and Paris Club. Many official prices already discussed were liberalised
and adjusted towards market prices in the early years of the economic rehabilitation reform period. Hence, CPI increased by almost 182 percent in 1987. The rate of inflation fell to 48 percent in (1988-1993) after initial adjustment, and has varied between 19 percent from (1988-1993) with the average annual increase of approximately 46 percent (National Planning Commission, 1994).

The government changed from a Marxist system and centrally planned theory of economics in 1989 in favour of free market principles with implementation of the new constitution the country in 1990. Historically the Mozambican economy has been dependent on foreign assistance but now it is slowly developing industry segments in a goal to become self dependent. During the 1990s, Mozambique implemented privatisation policies with an upward of 1000 businesses being privatised fixed with macro economic reforms to stabilise the economy. A larger percentage of the Mozambican population 75 percent earns their living as subsistence farmers within the agricultural sector which represents 30 percent of the GDP output, (Government Report of Mozambique, 2005).

Due to domestic credits to state owned companies, periodic scarcities of foreign exchange, since 1986, the MZM was grossly overvalued (fixed regime of exchange rate). The depreciation of the MZM and lack of resources in the early 1990s contributed to keeping inflation rate high. The liberalisation of the exchange rates in 1992 represented an important attraction in the process of price formation that better reflected the conditions of the market. It was in this context that the exchange market was established in 1996, where the main operators exchanged positions in foreign currency at an exchange rate set by the International Monetary Fund (IMF) (IMF, 2005).
The macroeconomic indicators were adjusted quickly to reform, and register the growth during (1987-1993), accompanied by higher volumes of export recovery. In this moment, higher level of external finance assistance closed to 20 percent of national product on average during on average during (1987-1993), around these, the economy registers higher volumes of current account deficits without an influence on the debt weight of the poverty reductions, at the end of 1992, (National Planning Commission, 2006).

Mozambique was classified around groups of poorest countries in the world, its status among the least developed countries with socioeconomics indicators were demonstrated by poor performance of the economy, while in the previous decade, it has experienced a remarkable economic recuperation, per capita of national product in 2004 was predicated at USD 276, a considerable change over two decades in the level of USD 120, (National Planning Commission, 2006).

The economy faced by higher foreign debt, initially USD 5.7 billion in 1988 net present value, and this period the effect of economy reform were denoted. Mozambique was the first African country to obtain external finance assistance under the initial Heavily Indebted Poor Countries (HIPC). During a four decade ago, Mozambique obtained the credible qualification for the improved HIPC program as well and achieved its closed point in middle of 2001. In November 2001, the Paris Club members agreed to substantial alleviation of the Mozambique debt. This led to the absolute clemency of a significant amount of debts, (National Planning Commission, 1994).
After 1995, the banking system was partially privatised, exchange bureaus were legalised, and, more generally, measures were taken to liberalise the current account of the balance of payments. This development helped create the basis for emergence of a relatively well-functioning retail foreign exchange market and as result the difference between the exchange rate applied by commercial banks, market rate, and that applied by exchange bureau, parallel rate, narrowed to less than 2 percent in early 1997 from 5 percent in December 1996 (Report of IMF, 2004).

The Mozambican currency, MZM, devalued against the USD by 1.5 percent in 1996, a much higher rate of depreciation than normal in particular year pos independence. The exchange rate policy of the central bank has been non-interventionist for several years. It has regularly been declared that the value of MZM should be determined by the laws of supply and demand. Since 1996, MZM has been a remarkably stable currency. It has held its value against the USD much better than the South African Rand, not to mention the Zimbabwean dollar, (Report of IMF, 2004).

For several months now, it has been clear that devaluation against the USD, once just a moderate decrease, has been picking up velocity. On the official exchange market, the MZM started the year at 13,300 MZM to the USD. On Friday, the figure was 13,500 a fall of about 1.5 percent. But on the parallel exchange market the fall was sharper from about 13,900 to 14,200 MZM to the USD, a devaluation of 2.1 percent. The difference between the official and the parallel rates is now 5.2 percent, considerably higher than the Central Bank of Mozambique had hoped, (Annual Report of Central Bank of Mozambique, 2006).
A further sign that something is wrong is that operators on the parallel market are buying USD at the rate of 14,200 MZM to the USD, but selling at the rate of 14,600. Under normal situation, the gap between buying and selling rates has been between 100 and 200 MZM on 31 January, of which for the Central Bank of Mozambique published, devaluation of over one per cent in a single month was excessively high, and that the spread between official and parallel rates should be around two per cent, (Annual Report of Central Bank of Mozambique, 2006).

The domestic currency had come under pressure from several directions, including the strength of the American economy and hence of the USD. The decision of the South African Reserve Bank to align the Rand to the USD, rather than let the Rand depreciate still further and additional factors were the political uncertainty that had surrounded the December general elections, (Annually Report of Central Bank of Mozambique, 2006).

The Consumer Price Index (CPI), recorded a cumulative inflation of 4.8 percent by December 1999 and 6.1 percent higher than the inflation registered in 1998, the real growth of the GDP was 9 percent, which is a reduced speed of 3 percent when compared to the growth rate in 1998. However deficit financing was covered by alternative to foreign grants equivalent to 42 percent which were destined to investment projects, and the remainder to current running costs, (Annual Report of Central Bank of Mozambique, 1999).
Thus the deficit after grants fell to 1 percent of GDP, as against the 2 percent recorded in 1998, the deterioration in the country’s external position is the result, above all, of a greater increase in the import of goods that amounted to 42.5 percent and services 8.3 percent. While the rise in the export of goods totalling 6.3 percent and services 5.4 percent was not very significant and MZM undertake an accumulative depreciation of 7.6 percent against the USD; with an exchange rate of 13,000 MZM/USD on the last day of 1999, in the same period of 1998, the devaluation of the MZM was 7.1 percent (Annual Report of Central Bank of Mozambique, 1999).

The acceleration in the depreciation of the MZM, principally in the period (1997-1999), was partially justified by the following factors, a greater demand for foreign exchange in cash, and the nominal appreciation of the USD against other currencies on the international market. The greater difficulty experienced by credit institutions in satisfying the demand for foreign exchange and a new dynamic in the economy consisting in charging residents in foreign currency for the payment of services. The Central Bank of Mozambique subsequently did not intervene on the exchange market to support the national currency, as it depreciated against the major foreign currencies, in particular the USD (Annual Report of Central Bank of Mozambique, 2005).

The year 2000, was a difficult year because of the natural disasters such as floods, which affected the national economy and the climate of political uncertainty in the period after the elections process. The MZM depreciated against the USD and reached its peak of 38 percent. Other factors that contributed to the nominal depreciation of MZM during this year were the expansion of the broad money above the planned level and the strength of the USD on the international market caused by a strong performance
of the American economy and an increase in the demand for USD. The RER depreciated in 2000 close to 15.8 percent and 5 percent in 1999 (Bulletin Statistical of Central Bank of Mozambique, 2001).

The two main currencies in the exchange market USD and Rand predominantly dropped the behaviour of exchange rate. In fact, in relation to the USD the exchange rate in December 2003 closed at MZM 23,856.00 standing closely to the same as it was on the last day of December 2002, (Bulletin Statistical of Central Bank of Mozambique, 2005).

The Rand exchange rate on the last day of December 2003 was MZM 3,518.00 the CPI recorded an annual variation of 13.8 percent, against an indicative target of 10.8 percent, compared with 2002. This variation represents an acceleration of 4.7 percent, and the GDP grew by 7.1 percent, against 7.4 percent recorded in the preceding year. Without the major projects, the growth rate was 6.2 percent. The current account deficit dropped by 26.7 percent in relation to the preceding year, due to decline of the deficit of goods account 35.1 percent and the income account 72.6 percent, (Bulletin Statistical of Central Bank of Mozambique, 2005).

There has been a deterioration of the services account by 16.2 percent and a drop of the surplus of the transfers account by 61.3 percent, and this representing a depreciation of 28.7 percent. In 2003 the Rand remained strong in relation to the main international currencies, and particularly in relation to the USD. In December 2002 from September 2003 the rate between MZM and Rand increased by 21 percent. In this case the South African currency improved its PPP in relation to USD, on the contrary MZM depreciated around 10 percent from 12 percent, (Bulletin Statistical of Central Bank of Mozambique, 2005).
The year 2004 was characterized by setting target inflation at 11 percent, representing a drop of 2.8 percent in relation to 2003. However, the annual inflation, measured by CPI, rose to 9.1 percent, which represented a slow down by 4.7 percent in relation to the previous year and 1.9 percent below the target. Preliminary estimates of the Ministry of Finance indicate that the GDP in 2004 recorded a real growth rate of 7.2 percent, a little below the target of 7.8 percent whilst budget expenditures increased by a nominal rate of 13 percent compared with the previous year. An insignificant depreciation of the MZM against the USD, as it moved from 0.01 percent in December 2003, to 20.8 percent in December 2004, (Bulletin Statistical of Central Bank of Mozambique, 2004).

In July 2005, in a meeting that was in Scotland, the countries with higher level of development, decided to liberate multilateral debt to the nations with lower level of development, such as Mozambique. End of 2005, the IMF stabilized official alleviation of the Mozambique debt, (Bulletin Statistical of Central Bank of Mozambique, 2004).

The immigration of refugees caused by the civil war, as a result of government reforms for the economy, has led to a substantial increase on the economic growth rate. On (1994-2004), the average annual growth rate was 8.25 percent. The national economy recorded this growth rate even though the natural disaster (floods) of 2000, which affected the national product and the growth rate decrease to 2.1 percent. The economy started a period of depression and during the next two years and were also consistent GDP growth rates were around 7 percent to 8 percent were expected again in 2006. These changes in the economy affected by the government policies reforms which
continue up to date, (Bulletin Statistical of Central Bank of Mozambique, 2004).

The national authority expected the similar growth rate through expansion policies, building infra-structure and created opportunities to attract more investments, and the projected of the growth rate was around 7 percent to 10 percent a year over the next five years.

The effectiveness of expansion policies lead to continued economic improvement, and the use of the external direct investment and the revitalisation of agriculture was the base of economy in Mozambique. Transportation and tourism sectors were considered relevant sectors that generated added value to the economy, (Bulletin Statistical of Central Bank of Mozambique, 2004).

The growth rate in the agricultural sector was the main indicators that illustrated the challenges faced by the government services in the economy. More than 80 percent of the populations in Mozambique are employed in the small scale agriculture sector where the objective is to produce goods for consumption, this segment of economy is characterized by the inadequate infrastructure with lower quality and capacity for produce at a large scale, commercial networks and investment is inefficient, (Bulletin Statistical of Central Bank of Mozambique, 2004).

Mozambique has a large arable land where is still unfarmed, leaving room for considerable economic growth rate. The performance of the economy was disturbed as a result of floods of 2000 and the inflation rate rose to 12.5 percent, (Bulletin Statistical of Central Bank of Mozambique, 2005).
The national authority implementing the reforms to push down the inflation rate stated that in 2003 the inflation rate was 13.5 percent, in 2004 the range of this indicator decreased slowly to 12.6 percent and the indicator used to measure the inflation rate was CPI, in this period the exchange rate was MZM 24,000.00 (before the policy adjustment of the currency) per each USD, though it has been as low as MZM 18,000.00 and as high as MZM 29,000.00 at different times during 2005, (Bulletin Statistical of Central Bank of Mozambique, 2004).

In 2006 the national authority introduced a new currency, where price denomination was less by three zeros compared with the old currency. This process was the one way where the study can see the effect of the reform of the financial sector in an attempt to simplify the rather complicated currency, where prices often predicted to run in the millions of MZM due to denomination, (Bulletin Statistical of Central Bank of Mozambique, 2006).

The program of economic reform has been prolonged to the private sector to more than 1,200 state owned enterprises and the plans for private and liberalisation sectors are in the progress, extended to the communication, electricity, ports and railroads. The national authority frequently brings strategies for external investments and also adjusted policies of duties and the law of customs was reformed, (Bulletin Statistical of Central Bank of Mozambique, 2004).

The government introduced a highly successful value added tax in 1999 as part of its efforts to raise local revenues. The strategy for 2005 to 2006 commercial system reform in terms of adjusting the macroeconomic policies and its results brought change in the
main and relevant sectors; reconsideration of the labour law; comprehensive legal reforms; financial sector rising, continued public and civil services reform, and enhanced government financial plan, audit and inspection capability, (Minister of Finance, 2007).

The national economy has been growing by 8.5 percent annually during 1996 to 2004, as a result of introduced Mega projects, external investment by the neighboring countries, floating donor support, and agricultural growth. During this period, most of activities expanded fast, such as agriculture, tourism, constructions and manufacturing. The growth rate in national economy implies a process of revolution in the composition of its national product, while services continued to be a central sector by 48 percent in 2004. In 1996 to 2004 the external investment supported in mega projects grew in average rate of 11 percent, more than most countries and a huge investment registered in 1998 and the agents was the mega projects such as Mozal, Vale, Rio Tinto ENI, Anadarko and gas pipeline to South Africa, (Minister of Finance, 2011).

1.3. Statement of the Problem

The biggest danger for emerging economies, such as Mozambique is to guarantee the convertibility between domestic and foreign goods, to assess the economic policies and performance in developing countries have underlined the crucial issue of the management of the RER. It’s shown that the best performers are the countries that have maintained an appropriate RER, one close to ERER.
In particular, all countries that have been successful have avoided RER depreciation. RER undervaluation was seriously debated in the annual report of the Central Bank of Mozambique. In fact the Mozambican currency was undervalued during the plan of the Central Bank of Mozambique, but there was no consensus over the amount of the undervaluation. This had a lot to do with the complexity of the measuring price indices right in the centre of the major price stabilization effort and with the currency reform introduced in 1992. In addition, interest in the undervaluation issue appeared to vary according to internal and external atmosphere, natural disaster in 2000, markets were floating and speculations purpose, price of crude, importable goods and inflation cost, (INE, 2006).

When the market was floating, the issue was left to one side and the currency was undervalued by 25 percent, and market participants seemed to consume more intensively the 25 percent undervaluation. In 1998, The Central Bank of Mozambique estimates pointed to misalignment level close to 14 percent, (Central Bank of Mozambique, 2004).

The annual report of the Central Bank of Mozambique expressed the depreciation of the RER by 33 percent and in 2000 the staff of Central Bank of Mozambique assumed that the real exchange rate was depreciated by 15 to 20 percent, to some extent there was a smaller level of depreciation than reported by the outside evaluation, which indicated that the RER was depreciated by 27 percent, (IMF, 2005).

In 2007 to 2010 the Central Bank of Mozambique estimated the depreciation of the RER by 10 to 15 percent, the annual report of Central Bank of Mozambique presented a
depreciation of 8 percent. The Central Bank of Mozambique estimated the degree of misalignment of RER and the estimates did not achieve their parameters estimated in success, (Minister of Finance, 2011).

This permanent features of the Mozambique economy leads to under performance of nation and also affects whole environment, such as budget deficit. The government expenditure was higher than the necessary revenue for economy, higher inflation, the level of prices were continuously increasing the cost of living, expressed by the PPP, current account deficit, the import is greater than the export and the trade balance is negative, most the products and service are produced out of Mozambique.

The low level of investment, the cost of capital is higher and this affects the level of investment and GDP and higher rate of unemployment, low level of investment and products, consequently affect the level of employment. In order to manage this crucial problem, the assessment of the exchange rate policy it is necessary to successfully the economy and identifies what constitutes exchange rate.

The instability of the economic indicator, exchange rate deteriorated at the beginning of 2010 as a result of funds supported by the national authority in the reforms of the economic system, these effects caused a higher pressure on the demand of external funds for imports the primarily and important goods, like fuels whose bill has grown due to local consumptions raised and also the international prices increased, deteriorate the balance of payments, situation that comes as result of international financial crisis that affected Mozambique’s exports significantly and trade balance because most of price of domestic goods was determined by IMF. In addition to those factors mentioned,
they also affected most of external currencies, Rand intensification and the USD instability in the external market.

The South Africa currency was stable and robust due to the exportation potential of gold and precious metals. These natural resources have impacted in the world economy and international assessment reached the remarkable reported and also the robustness of the economy performance in 2010 and as consider the power economy in the southern Africa, where influenced a relevant investments and income associated to World Cup. The USD stronger economy in the external market by the characteristics of the composition industries sector, on the one hand, it shows the United States of American economic recovery gains constantly, but on the other, it conducts from the deterioration of public finance and the fiscal consolidation process in many countries.

Most empirical studies show that the tendencies of a robust currency in international market are much uncertain. The phenomenon of exchange rate war, where most authorities in several countries assume currencies devaluation in essence used to predict the trade deficits thus to improve the competitiveness in economy. The disturbances of foreign exchange market have been considered monetary aspects and in the floating system it’s necessary to have a restrictive monetary policy in the economic environment, (Minister of Finance, 2011).

The respecting of the commitment has assumed the net international reserves in August of 2010, they decided to raise the foreign currency sales between banks in the way to stabilize the liquidity and to solve the problem of inflation pressure and reinstate foreign exchange stability. The problems of most primary goods were covered at 100 percent
and this implies the allocation of huge foreign currency in the market and the decrease demand pressure in commercial banks and the effects of transmitted a good signal in the relations to the foreign exchange short and medium terms tendency and the disposable of foreign currency. In respect of this the researcher wishes to understudy this thesis focusing on this loaded question:

What were the implications of exchange rate policy in Mozambique for the sustainability of the economy, during 2000-2010?

1.4. Significance of the Study

The avoidance of misalignment is so important for two reasons:

- When the exchange rate is misaligned, it will not provide the appropriate signal to guide the allocation of the resources between domestic and foreign goods and significance part of goods and services consumed in Mozambique are produced in foreign countries and

- When the RER is perceived to have become severely misaligned, the expectation will be created that it will adjust toward its equilibrium value for the macroeconomic mechanism.

The nominal and real exchange rates are important variables in macroeconomic management. However the nominal exchange rate tends to overshadow the real exchange rate because of each central position in everyday foreign exchange market business. Following the concepts of those two macroeconomic variables, the nominal
exchange rate connects the price systems in different countries and allows international traders to compare prices directly from domestic goods.

The volatility of the nominal exchange rate has a direct impact on the imports and exports, both on the goods and financial market as well as the financial account and consequently the balance of payments. Due to the impact on foreign trade, currency valuation causes domestic goods to be expensive abroad and foreign goods cheap in that country. On the contrary, when countries practise currency devaluation, its goods and services in foreign countries become cheaper and foreign goods in that country become expensive. These gives a relevance on how the economy is guided through the exchange rates perspectives and the researcher will demonstrate how the exchange rate policy has influence on the economic growth of Mozambique.

Let’s assume, if one good with price cost of USD 5,000.00 and the price of USD 1.00 in Mozambique today is MZM 10,00 then, if we want to know the cost prices in Mozambique should be MZM 50,000.00 (with a rate of change of MZM 10,00 a unit of USD), in addition if an importer wanted to bring the goods to Mozambique, assume the importer takes a four week period and the changing rates moves to MZM 6.00 per unit of USD (the USD depreciates and MZM appreciates) and the goods would cost MZM 30,000, assuming the USD price of the good remains unchanged. These simulations shows the relevant implications of the exchange rate on the economy in the relations between importer and exporter and also how its affected the current account.
The RER, which reveals the nominal exchange rate adjusted for changes in the different levels of prices among the domestic economies and the rest of the World (external RER), is nevertheless, ever more significant than the nominal exchange rate.

Several researchers have argued that RER have important effects not only on general economic performance and international competitiveness, but also on the different sectors of the economy, foreign trade flows and balance of payments, employment, structure of production and consumption, external debt crisis and allocation of resources in the economy. In addition, they further argued that RER are particularly important for developing economies such as Mozambique, where traded good sectors are important share of gross domestic product (Edwards, 1989; Montiel, 2003).

Since the RER is a crucial variable not only for macroeconomic performance, but also for segment performance, it is crucial to understand it so as to better manage it and place the economy on path of growth and sustainable development.

The general relevance of the study is that it to attempts to understand the relationship between RER and real macroeconomic variables such as Government Consumptions (GC), Term of Trade (TOT), Trade Restrictions (TR), Technology and Productivity (TP), Foreign Direct Investment (FDI), Reserves (RES) in particular, by using Mozambique as empirical evidence. The study will give quantitative information which enables us to know and when to use an exchange rate policy to correct RER misaligned.
The stability of RER and real macroeconomic variables, have an implication for RER management for it helps in the manipulation of real macroeconomic variables by policy-maker at this critical moment of the country’s economic circumstances. On the other hand, if there is no significant negative appreciation, it follows that the Mozambican exchange rate policy should give greater priority to other policy instruments or measures to achieve RER stability.

A further justification for the study is the benefits desired by applying the real macroeconomic variables as determinants of RER, like many other apparently revolutionary analytical tools and approaches, will be added to economist kits and increase the stock of knowledge in economics.

Finally, it is also hoped that this study will serve as one of the studies or research work aimed at verifying or refuting RER theories since any theory, regardless of its elegance in exposition or its sound logical consistency, cannot be accepted without some empirical testing and finally for self-fulfilling interest.

1.5 Objectives of the Study

1.5.1. General Objective of the Study

The main objective of this study is to make an assessment of the exchange rate policy in Mozambique for the sustainability of the economy, during 2000-2010, which is strongly recommended as an essential macroeconomic policy aimed at achieving a higher and sustainable growth, since it is crucial for an economy to constantly assess the degree of
the misalignment of its currency in order to avoid economic depression.

1.5.2. Specific Objectives of the Study

This broad objective is explored through the following specifies objectives, the focus of attention on four transmission channels through which fluctuations in the exchange rate affect economic activities:

- To analyze the effects of the sensitivity of exchange rates on current account and its impact of the economy;

- To evaluate the effects of exchange rate on the expenditure through the alteration of trade volumes;

- To analyze the changes in exchange rates and its effects on the price of companies goods and its obligations and

- To evaluate the change in the exchange rate on the effects on the local currency value of foreign goods and its obligations and can have consequences for economic growth.
1.6. Scope of the Study

- The study attempted to assess the exchange rate policy in Mozambique for the sustainability of the economy, during 2000-2010.

- The research is quantitative in approach because by the nature of the depreciation is expressed by number and the techniques used for estimations the relationship between variables was Engle and Granger (2003) Cointegration, which gives clear pictures on how any change in the exchange rate, in addition, the data used in this particularly research are historical or secondary data.

- The major variables used in this research were: Government Consumptions, Term of Trade, Trade Restrictions, Technology and Productivity, Foreign Direct Investment and Reserves. The data were converted from annually to quarterly used Lisman and Sandee approach (1967).

- The theories used in this study are: Purchasing Power Parity, Balassa-Samuelson and Edwards (1989), Elbadawi (1994) and Montiel (2003) inter temporal general equilibrium model for small open economy, considered two countries and assumed the economy operates with tradable goods, non tradable goods and exportable goods.

- The Researcher assumes there have two types of exchange rate regimes: which are fixed and floating regimes. In this particular study the model applied assumes floating regimes, where the exchange rate must be depreciation or
appreciation.

- Due to the fact that it captures important stylized facts of an open economy, the study involves the analysis of five variables respectively, RER as a dependent variable and exogenous government expenditure, terms of trade fluctuations, trade restrictions and capital controls, hold other variables that affect the RER in constant. The model has become a standard model for empirical analysis of the behaviour of the RER in Mozambique.

1.7 Hypothesis of the Study

1.7.1. General Hypothesis of the Study

Null Hypothesis ($H_0$): The exchange rate policy in Mozambique affected positively the economy for the sustainability of the economy, during 2000 Ð 2010.

Alternative Hypothesis ($H_1$): The exchange rate policy in Mozambique affected negatively the economy for the sustainability of the economy, during 2000 Ð 2010.
1.7.2. Specific Hypothesis of the Study

Null Hypothesis ($H_0$): Change in exchange rates has generated any changes in current account (import and export prices) and in the case of prices of imports.

Alternative Hypothesis ($H_1$): Change in exchange rates has not generated any changes in current account (import and export prices) and in the case of prices of imports.

Null Hypothesis ($H_0$): The change in the exchange rate affected the expenditure-switching and trade volumes.

Alternative Hypothesis ($H_1$): The change in the exchange rate not affected the expenditure-switching and trade volumes.

Null Hypothesis ($H_0$): Changes in exchange rates has an impact on the companies profits in a number of ways.

Alternative Hypothesis ($H_1$): Changes in exchange rates has not an impact on the company’s profits in a number of ways.

Null Hypothesis ($H_0$): The change in the exchange rate has valuation effects on the domestic currency value of foreign assets and liability holdings.

Alternative Hypothesis ($H_1$): The change in the exchange rate has not valuation effects on the domestic currency value of foreign assets and liability holdings.
1.8. Limitations of the Study

Although there are numerous things that can be studied in real exchange rate, this study focused on the ERER, based on six variables Government Consumption (GC), Terms of Trade (TOT), Trade Restriction (TR), Foreign Exchange Reserves (RES), Technological and Productivity (TP) and Foreign Direct Investment (FDI).

- There was lack of local expert supervisor, hence the author has to rely on supervisor from Zimbabwe Open University (ZOU) appointed Dr. Ignatius Isaac Dambudzo to supervise this thesis.

- Insufficient relevant literature was a problem. The author has to rely on published articles, text books, government official report. Additional information was collected from internet, through care was exercised for verification and authentically.

1.9. Ethical and Legal Considerations

To fulfil the relevant ethical and legal implications, the researcher has to consider the follows principles:

- Applied for a ZOU permit to conduct research;

- Applied for permission to the Government of Mozambique (Central Bank of Mozambique) to conduct research in the selected communities;
Explained to the respondents the significance of the study and contributions it would make to the development of their personal lives and the country as a whole;

Kindly asked the respondents to respond willingly, truthfully and objectively and promise the respondents that their rights of confidentiality, anonymity, freedom of choice and expression will be adhered to;

All the information given by the respondents was not to be disclosed and the data used area officials, collected from the annual report of central banking of Mozambique;

1.10. Structure of the Study

For a systematic and scientific approach, this research is divided into five chapters, which are further subdivided into sub-sections. The study is organized as follows, chapter one presents general introductions, statement of the problem, general and specific objectives, research hypothesis, scope of the study, significance of the study, limitation of the study and the structure of the study.

Chapter two, the related literature review is documented, focussing on the theoretical and related studies, started with general issues related to RER, a brief discussion on the conceptual issues, effect of the RER on misalignment of determinants of the RER, measurement of the RER theory, such as, PPP, Balassa-Samuelson, and Edwards and Elbadawi and Montiel and related literature from Mozambique.
Research methodology is presented in Chapter three, starting with the general overview, empirical methodology and research design and data collection instruments.

Chapter four concentrates illustrating two different perspectives of the research findings and interpretation, through main a graphic illustrations, tables and analysis through regression.

Finally chapter five gives both the conclusion and the recommendation.

1.11. Definitions of Terms

1.11.1 Competitiveness

Ability of a country to produce goods and services which are able to sell in the global market, the degree of measure the level of competitiveness of economy are expressed by the exchange rate and there is none a space for a closed economy all over the world, (Cassel, 1914).

1.11.2 Developing Countries

Are nations in which the average annual income is low, high budget deficit and inflation. In general, developing countries are not highly industrialised and are dependent on foreign capital and development aid, also known as third World countries, (Agenor, 2003).
1.11.3 Equilibrium Real Exchange Rate

It is the value of the RER that is simultaneously consistent with internal and external balance, conditioned on sustainable value of exogenous and policy variables, (Montiel, 2003).

1.11.4 Exportable Goods

Goods and services produced in domestic countries and consumed by other countries. This feasible when the internal consumptions is satisfied and the excess goods and service is trade with other nations or economy and the opposite is importable goods, (Dhilowayo, 2002).

1.11.5 Government Consumption

Measures relative Gross Domestic Product captures the propensity to consume non tradable goods (Edwards, 1989).

1.11.6 Non tradable Goods

Are good and service which cannot cross country boarders. This is because either transport cost prohibits the export or import of a good, or due to the virtually non tradable nature of the goods such as, public services, land, housing, construction, local specials which are not traded on the World market (Montiel, 2003).
1.11.7 Real Exchange Rate

Is the relative price of the goods of two countries (Montiel, 2003).

1.11.8 Terms of Trade

Measure the relative price of exports price to imports to influence of external demand and supply factors in the tradable sector (Edwards, 1989).

1.11.9 Tradable Goods

All goods and services produced in an economy which are actually or potentially imported or exported (Edwards, 1989).

1.12. Chapter Summary

This chapter provided brief comments on general aspects of the policy of real exchange rate in economic growth particularly for Mozambique. The concepts and approaches used in the workplace, projecting a clear and coherent picture for readers to each context. Consistency with the general aspects of the study and the study problem, related to the scale of the objectives of studies, research make a bridge with the assumptions of the studies presented in this chapter.

Additionally, this chapter presented the rationale of the study as it is divided into distinct characters in terms of contribution, limitation and delimitation of the study on the basis of the area of research, providing the directions to the objectivity of
relationship with the relevant related literature, identifies gaps in existing knowledge and how they should be leading the way to overcome these obstacles.

This chapter provides the methodological framework to be used and crucial legal issues and ethically considered. At the end of this chapter contains the structure of the thesis organization and definition of terms.

In Mozambique, as in other countries the real exchange rate plays a key role in the performance of the economy, when one looks at the actual situation of economies, where the context of closed economy, one that is unrelated to outside, has no space in humanity, giving the open economy, which has relation with the outside, so the fact that there is no purely closed economy, able to produce everything that the economy needs field.

Based on the assumption above, it should be noted that a change in the real exchange rate in Mozambique, on average affect the main macroeconomic variables, namely cost of living of Mozambican families, money supply, trade balance, unemployment rate, interest, investment, public consumption and budget deficit.

This feature is typical for the economies of developing countries and Mozambique is no exception. This study will illustrates in ways in which variables explain the variation in sensitivity of the real exchange rate and what steps they need to take in order to avoid this occurrence that purely negative influence on the performance of the economy.
Mozambique is purely depended on other economies and the effect of dependence on South African economy has generated industrial linkages on the transport for the Mozambican economy.
CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1. Introduction

The focus of this chapter is to unveil the literature review on the exchange rate and this section gives an analysis of the relevant related literature. Part of this section shows theoretical literature review, empirical studies, focus related literature review and chapter summary. The chapter also presents different perspectives and implications for the policies and decision maker in the exchange rate.

The problem of defining and measuring the ERER is complicated by several of factors, such as level of money supply, prices level, cost of productions and level of import and export, all have direct impacts on the exchange rate. The basic one is that no single concept of RER is widely accepted among economists. Recalling that, in broad terms, RER is simply the relative price of foreign goods in terms of domestic ones. But what constitutes domestic and foreign goods depends on the particular analytical structure that specific macroeconomics model-being used. Since different types of macroeconomic models are used by economists for different reasons, a variety of the analytical RER definitions tend to be used, (Montiel, 2003).

The notion of what are domestic and foreign goods may be simple to identify within specific theoretical models, most of which contain at most three goods such as tradable, non tradable and exportable goods. In the real world, things tend to become more complicated particularly, in a context in which there are many goods it is not always obvious how to come up with empirical complements to the price of domestic and foreign goods that it's trying to measure. Different approximations result in different
empirical definitions even the theoretical concept is unambiguous, (Edwards, 1989).

It is important to know whether the RER is misaligned and how to avoid misalignment. In the context of exchange rate management, it is perceived that, since the actual RER can be observed, the detection and measurement of RER depends on the ability to define and estimate an ERER. The discussion of exchange rate management is considered by what is meant by the notion of an ERER, and how it is measured. The study explores the theoretical determinants of the long run ERER and different approaches to empirical dimension, (Edwards, 1989).

From the primitive times, trade involved discrepancies in values exchanged, established in credit or money, and these discrepancies constitute the origin of the concept of exchange rate. There is a huge theoretical and empirical literature on the ERER determination. This literature includes models for undeveloped and developed economies. Most of the observed creative writing in this group focuses on identifying the ERER for developed nations that are generally based on the methodologies that include PPP, Balassa-Samuelson and fundamental approach (Edwards, Montiel and Elbadawi, 2004).

Given the analytical framework that is suitable for the dilemma at hand, the next issue in empirical application is how to interpret the relevant concept into a theoretical measure of the RER. The most frequent way to measure the RER empirically is to take a foreign price index, express it in domestic-currency terms by multiplying it by a nominal exchange rate index, and then dividing by a domestic price index. These have some problems, however what do we mean by foreign price index when there are many
foreign countries? If there is more than one exchange rate against some foreign currency, which one is used and which price index do we use, CPI, Producer Prices Index (PPI), Gross Domestic Product (GDP) deflator. The most general choice is to use the trade-weighted CPI in foreign countries ($CPI_{USD}$) to measure in domestic currency ($CPI_{MZM}$) for the foreign price index, and the CPI for the domestic price index. This is called the RER, (Edwards, 1988).

$$RER = NER \frac{CPI_{USD}}{CPI_{MZM}}$$

[Equation. 01]

Where RER is Real Exchange Rate,

$CPI_{USD} \quad United States, Consumer Price Index,$

$CPI_{MZM} \quad Mozambique, Consumer Price Index.$

$NER \quad Nominal Exchange Rate$

The ratio of RER is weighted average of domestic traded and non traded goods prices. This indicator will only show change in the internal RER in the quiet form. The numerator contains foreign traded and non traded goods prices. The information it has about the incentives facing domestic agents who consume and produce traded goods or non traded goods, will be contaminated by the changes in the foreign internal RER, which is not relevant for domestic agents, (Edwards, 1988).

For this reason some economists prefer to use the trade-weighted Producer Price Index (PPI) for partner countries, on the grounds that it contains a larger share of traded goods. The numerator cannot raise the effects of change in the commercial policies on the
domestic relative price of traded and non traded goods. When such policies change this measure will fail to indicate the appropriate changes in the incentives facing domestic agents, (Edwards, 1988).

2.2. Real Exchange Rate and Long Run Relationship-Conceptual Issues

Real Exchange Rate misalignment refers to a continued and deviation of the behaviour of observed RER from its long run estimations pathway. A situation could support in two options or cases, once the observed RER fails to reproduce relevant signals to driven changes in the long run associations or equilibrium and also when the RER going to the Equilibrium of Real Exchange Rate (ERER) along that, non reveals driven changes, Edwards (1994).

A hypothetical perception, the concept of the RER misalignment supported with two agents such as institutional or other types of rigidities that avoid the RER behaviour from adapting in direction of its equilibrium level, Edwards (1994).


Misalignments occur under both fixed and floating exchange rate regimes and have pointed out that in the fixed rate adjustable system; misalignment reflects poor policy fundamentals that prohibit the exchange rate to adjust to changes in economic fundamentals. Whereas in floating exchange rate regimes, irrelevant factors such as speculative attacks that moves the exchange rate too in relation to fundamentals are the primary causes of misalignments.
The cause of change in both actual RER and ERER is intuitively understanding of dynamism movements and these are most important to analyze the correction of misalignment or the permanent devaluation of the exchange rate. The original approach illustrate that the long RER as a value of estimate exchange rate that is consistent with internal and external equilibrium. When the market of non tradable goods is clear is internal equilibrium and when the current account is superavit, conceptually, exchange rate is considered overvalued (fixed regime) and appreciated (flexible regime), (Montiel, 1999).

**Figure 2.1: Equilibrium Real Exchange Rate**

![Equilibrium Real Exchange Rate Diagram](source: Montiel, 1989)
In figure 2.1, the Internal Balance (IB) schedule refers to a situation of IB that the condition attained when the non tradable goods market clears. The IB schedule slopes downward because starting at a position of equilibrium, a decline in domestic demand, due to a fall in private or government spending creates excess supply of non tradable goods at the original RER. Restoration of equilibrium, thus, requires a depreciation of the RER shifts supply towards traded goods and demand towards non tradable goods.

Thus, a fall in domestic demand for non tradable goods is accompanied by depreciation of the RER making IB schedule slope downward. Points to the right of the IB schedule show the excess demand for non tradable goods in the domestic goods market while points to the left show excess supply of non tradable goods. Both cases thus reflect a situation of internal disparity, (Montiel, 1989).

In the same way, the External Balance (EB) schedule represents the situation of the external balance, which is a situation showing that the current account is well performing. The EB schedule slopes upward. Starting at any point on the EB schedule, a rise in domestic demand for tradable goods generates current account deficit at the original RER. Therefore, restoration of equilibrium requires a depreciation of the RER to shift demand from tradable goods to non tradable ones and output from non tradable to tradable goods.

The right of EB schedule reflects excess domestic demand for tradable goods, hence current account deficit while points to the left of the EB schedule show current accounts surplus. The ERER, q∗, in the diagram, is the level of the RER that is simultaneously consistent with internal and external balance. This is attained at point E in the graph,
where the IB and the EB schedules intersect, (Montiel, 1989).

The changes in the RER, for instance, the depreciation and appreciation, can be identified as justified depending on the nature of the change. Justified changes are equilibrium phenomenon caused by the real events in the economy such as technological progress, change in the external terms of trade, trade restriction and capital inflow. Whereas, unjustified changes are departures of the RER from the equilibrium path. Thus it can be abstracted that exchange rate misalignment occurs when the RER fails to freely alter in reaction of justified changes in the exchange rate fundamental and when it moves in response to unjustified changes, (Edwards, 1988).

2.3. Effects of Misalignment

The determinants of the international level of competitiveness is any important in established the external payment position of a country and in simples terms, trade competitiveness is a producing efficient and improved the level of cost than the other by producing the same goods in the external market. The change in the RER is the good signals of trade competiveness in a country, although the trade competitiveness is offered by time series changing of the RER and does not differentiated between equilibrium and other actions of the association.

The repercussions of the result caused by changing in RER (appreciation or depreciation) of the RER its not meaning that failure of economy or competitiveness these could affect the relative RER and also the equilibrium tendency.
In general the effects of constant depreciations brings in the economy any impact on trade competitiveness and it is obvious that persistent depreciation of the exchange rate implies export prejudice and that influence on the incentives and capability of exporter to be more rational on the external market. Similar institution clarifies that RER depreciation leads devastated the level of competitiveness, mainly on the import competing sectors because they face a relative cheaper than other, (Elbadawi, 1994).

According to the Edwards et la (1989:123), argue that:

Protracted currency depreciation causes a sustained loss of trade competitiveness, which is usually manifested through prolonged trade deficit and capital outflows. The main explanation that supports this has underlined that the competitiveness of an economy does not simply depend on price and installed capacity, but also depends crucially on invisible investments in market position such as distribution networks, customer consistency. This implies that the effects on exchange rate misalignment on competitiveness is not contemporaneous but rather is through a time lag.

2.4. Determinants of the Real Exchange Rate

The estimations of the RER used the model study by (Emre and et al, 2000), Where the instantaneous relation of long run equilibrium between current balance and the non tradable market is reached. Consider a small open economy where the model illustrated three variables, such as:

\[ X \quad Exportable; \]
\[ M \quad Importable \quad and \]
\[ N \quad Non \quad Tradable. \]

The small open economy produces the non tradable and exportable goods for external
market and consumes the non tradable and importable goods. The study supposes that the country trades with one country, which is satisfactorily large.

The small open economy determine the exchange rate by used the flexible exchange rate regime, with $E$ represent the nominal exchange rate in all volumes of trade with other country. Let $P_M$ and $P_N$ be the prices level of importable and non tradable goods respectively. The universal level of price of exportable goods is normalized to unity, $P_X^*=1$ so the local level of price of exportable goods is $P_X = E P_X^* = E$. The universal level of price of importable goods is denoted by $P_M^*$, (Emre and et al, 2000).

According to (Emre and et al, 2000):

Define $e_M$ is the ratio of relative prices of imports and exports for foreign countries and $e_X$ is the ratio of price of imports and exports for domestic country, respectively:

$e_M = \frac{P_M}{P_X}$  \[Equation 02\]

And

$e_X = \frac{P_X}{P_M} = \frac{E}{P_N}$  \[Equation 03\]

Then the relative price of importable goods with respect to non tradables is

$e_M^* = \frac{E P_M^*}{P_N}$  \[Equation 04\]
The country imposes tariffs on imports so that

\[ P_M = E P_M^* + \tau \]  \hspace{1cm} [Equation 05]

Where \( \tau \) is the tariff rate.

The total output, \( Q \), in the country is

\[ Q = Q_x (e_x) + Q_N (e_x) \]  \hspace{1cm} [Equation 06]

Where \( Q_N > 0 \) and

The private consumption, \( C \), is given by

\[ C = C_M (e_M) + C_N (e_N) \]  \hspace{1cm} [Equation 07]

Where \( C_M \) and \( C_N \) are consumption on importable and non tradable goods respectively,

\( C_M < 0 \) and \( C_N > 0 \)
We define the real exchange rate as the relative price of tradable goods to nontradables and denoted it by \( e \):

\[
e = \alpha e_M + (1 - \alpha)e_N = \frac{E|\alpha P_M + (1-\alpha)|}{P_N}
\]

[Equation 08]

Where \( \alpha \in (0,1) \)

The study assumes that capital is completely mobile in the long term, and represents foreign assets with \( A \). Dealers hold part of their wealth in form of foreign assets, whose yield is shown as \( r^* \). The current account of the country is the sum of the net yield of foreign assets held and the amount of the trade balance expressed in foreign currency, which is defined as the difference between exports and the consumption of imports, (Emre and et al, 2000).

\[
CA = r^*A + Q_N(e_n) - P_M C_M(e_M)
\]

[Equation 09]

The variation in the foreign exchange reserves in the economy is shown by:

\[
R = CA + KI
\]

[Equation 10]

With \( KI \) the net capital flow

In the short and medium terms, the economy may depart from the state of equilibrium defined by \( R = 0 \), and the level of assets in the economy may vary. The current account is said to be sustainable when the current account deficit is compensated by the net
capital flow. Thus external equilibrium is achieved when the sum of the balance of the current account and the capital flow is zero, (Emre and et al, 2000).

\[ r A + Q_X (e^*) - P_M C_M (e^*) + KI = 0 \]  \hspace{1cm} [\textit{Equation 11}] 

Moreover, internal equilibrium is achieved when the internal market of non tradable goods is in equilibrium,

\[ C_N (e_N^*) + G_N = Q_N (e_N^*) \]  \hspace{1cm} [\textit{Equation 12}] 

With \( G_N \) public expenditure on non tradable goods, equilibrium exchange rate is defined as being the relative price which ensures external and internal equilibrium at the same time. From [equation 9] to [equation10] onwards, equilibrium exchange \( e^* \), can be defined \( P_M^*, \tau^*, A^*, KI^* \) and \( G_N \), (Emre and et al, 2000).

\[ e = e(P_M^*, \tau^*, A^*, KI^*, G_N) \]  \hspace{1cm} [\textit{Equation 13}] 

The equilibrium level of the RER is therefore a function of the terms of trade, commercial policy, foreign assets, capital inflow and public expenditure. The variables in the equation [equation 13] constitute the fundamental of the level of the real change in equilibrium over the long term. An increase in public spending on non tradable goods leads to an increase in the level of real change, or in other words, deterioration in the competitive position of the country. Freeing up trade will lead to a real depreciation in the country’s currency, which is necessary if its competitiveness is to improve, (Emre and et al, 2000).
An improvement in current balance is associated in the long term with an improvement in the real exchange rate while the effect of the terms of trade is uncertain. On the other hand, an increase in the terms of trade leads to an increase in national revenue, and therefore in spending, which leads to a real depreciation. Studies carried out in developing countries found that for the three of them, an improvement in terms of trade led to an increase in the RER, while for the other four, it led to a depreciation, (Elbadawi and Soto,1995).

2.5. Measurement of Real Exchange Rate Theory

There are huge theoretical and empirical literature on ERER, however, estimation of ERER has remained among the most controversial and challenging issues in modern macroeconomics. Due to this lack of consensus, economics theory provides little guidance on appropriate estimation methodology of ERER. The several models have been under developing in assessment to connect the deficiency on literature and the representation can be categorized in to two such as those models relevant for industrialized countries and those that represent features of developing countries. The key difference between these two broad categories lies on the specification of the ERER, (Montiel, 1999).

The models in the first category reflect relevant features of the industrial countries postulating a natural rate of output or natural rate of employment. Under this category, the PPP model and its variants are the most empirically utilized approaches for the estimation of the ERER. Other models that are widely used include Fundamental Exchange Rate, the IMF desired Equilibrium Exchange Rate, and Natural Equilibrium
of RER (Interalia and Williamsons, 1994).

The PPP models intend to estimate the ERER based on the essential macroeconomic fundamentals. PPP being the most widely used approach in the empirical estimation of the ERER for both industrialized and developing countries, we have critically examined its main features below with more relative details, (Interalia and Williamsons, 1994).

2.5.1 The Purchasing Power Parity Approach

Purchasing Power Parity is a practice used once when one need to estimate the relation between two currencies and the approach its relevant because the quantity of goods and currency can purchase with two countries frequently change radically and the models based on the disposable of goods, demands for goods and a volumes of goods are limited to settle on the factors, (Balassa, 1964).

The PPP explains this complexity by considering the some international indicators and demonstrated the cost for the category of instrument in two countries and related the quantity. The PPP indicator has becoming a model in the art for explain the exchange rate determination. Initially it was used the Napoleonic wars and at this time the model was considered as source in the Mercantilist, but it came into significance in 1916 during the writings of the Swedish economist, (Cassel, 1945) and (Balassa, 1964).
The PPP model during the First World War came out after the failure of the Bretton Wood System. The approach constituted of exchange rate and the theory of PPP which shows that the exchange rate between two currencies reached their equilibrium when the local purchasing powers at that rate of exchange are equal. In other way, the value of domestic currency in relation of external currency falls as a result of any additional units in the local price level (Bailie and McMahon, 1991).

The principle of any economy is a law of one price, which state that an identical or the same goods should have only one price even at different countries at the same times. If the prices are not the same in two economies, one of the other good will take more benefits than the other, assume that if it is cheaper to buy one tonne of rice in Mozambique than in Malawi, it would be more beneficial to buy rice in Mozambique and resell in Malawi. This progression of taking advantages of different prices is called arbitrage, (Bailie and McMahon, 1991).

The idea behind to the PPP is to demonstrate the relationship between the exchange rate and the price level. The absolute PPP exchange rate equates the national price level in two countries if expressed in a common currency at that rate, so that the PPP of one unit of a currency would be the same in the two countries. Many goods are not simply traded from one country to another. Traded goods are not always perfect substitutes when they are produced in different countries and exchange rate does not always move to ensure that a dollar has the same real value in all countries, (Bailie and McMahon, 1991).
To begin with, PPP simply defines the nominal exchange rate as the ratio of home and foreign country prices and can be expressed as:

\[ S_t = \frac{P_t}{P_t^*} \]  \hspace{1cm} [Equation 14]

\[ \log S_t = \log P_t - \log P_t^* \]  \hspace{1cm} [Equation 15]

\[ \log S_t = \alpha + (\log P_t + \log P_t^*) + \epsilon_t \]  \hspace{1cm} [Equation. 16]

\[ S_t = \alpha + (P_t + P_t^*) + \epsilon_t \]  \hspace{1cm} [Equation 17]

Where \( S_t \) is the log of the nominal exchange rate, \( P_t \) and \( P_t^* \) are the log of home and foreign price indices, \( \epsilon_t \) is a stationary Random variable. Similarly, the PPP approach refers to the RER as the nominal exchange rate adjusted for differences between domestic and foreign currencies.

\[ RER = S_t + P_t^* - P_t \]  \hspace{1cm} [Equation 18]

Substituting [equation18] into [equation 17] we get,

\[ RER = S_t + P_t^* - P_t = \alpha + \epsilon_t \]  \hspace{1cm} [Equation 19]

With \( \alpha \) being a constant and \( \epsilon_t \) being a white noise error term [equation 19] captures
the supporting structure of the PPP hypothesis that the RER is constant overtime and so does the ERER by implication (Montiel, 1999 and Edwards, 1988). This is an extremely restrictive assumption. Nevertheless, as Macdonald (2000) pointed out, in the face of the restrictiveness of the PPP assumption, it is often unfortunately the first model of equilibrium economists use to consider if a currency is misaligned.

Traditionally tested by running regression as shown below and testing for unit root, for $\beta_i = 1$, represents the change in explanatory variables $P_t - P_t^*$, will cause a change in dependent variable by the same proportion, (Macdonald, 2000).

$$S_t = \alpha + \beta_i \left( P_t - P_t^* \right) + \epsilon_t \quad [\text{Equation 20}]$$

The PPP of the international money USD is all the time related at domestic and external markets, the exchange rate cannot vary. The NER between the currencies of two countries must replicate the different price levels in those countries. When the central bank generates revenues by printing money (Seigniorage), the money loses its original value in market, in this view, goods and services it can acquired in relation of quantity of the other currencies it can buy, (Macdonald, 2000).

2.5.2 Balassa-Samuelson Model

A systematic divergence between the nominal and real exchange rate appears when economies producing tradable and non tradable goods are considered. This hypothesis depends on the assumptions that tradable goods determine the nominal exchange rate
between two countries, that both countries produce tradable and non tradable goods, that wages equalize between sectors but not between countries, and that more developed countries enjoy higher productivity than less developed countries in the tradable sector. Another factor that leads to deviation from the PPP is the lack of perfect substitution between tradable goods in two different countries, (Balassa, 1964).

Theoretical framework that encompasses the tradable and non tradable theory with a balance of payment approach. The model considers small open economy with two countries, each producing a tradable good \((T)\) and a non tradable good \((N)\). The real exchange rate \((q)\) in logarithmic terms can be defined such as,

\[
q = s + P - \overset{\star}{P}
\]

\[[Equation\ 21]\]

Where \(P\) and \(\overset{\star}{P}\) are the domestic and the foreign CPI, respectively, and \(s\) is the nominal exchange rate. For each country, the CPI, which is formed by prices of domestic and foreign tradable goods and non tradable goods, can be expressed as follows,

\[
P = (1 - \alpha_T - \alpha_N)P_T + \alpha_N P_N + \alpha_T\left(\overset{\star}{P} - s\right)
\]

\[[Equation\ 22]\]

\[
\overset{\star}{P} = \left(1 - \alpha_T - \alpha_N\right)\overset{\star}{P}_T + \alpha_N\overset{\star}{P}_N + \alpha_T\left(P_T - s\right)
\]

\[[Equation\ 23]\]

Where \(\alpha\) \(s\) determines the share of each good in the CPI, substituting these expressions into [equation 21] obtains,
$q = \left(1 - \alpha_T - \alpha_T^*\right)\left(P_T + s - P_N^*\right) + \alpha_N \left(P_N - P_T^*\right) - \left(P - P_T\right)$ \hspace{1cm} [Equation 24]

Where the weight of non tradable goods for two countries is assumed to be the same and tradable goods of the two countries are not perfect substitutes. The later expressions indicate that the real exchange rate is determined by the two different components, the evolution of prices of domestic tradable goods in relation to prices of foreign tradable goods.

$q = \left(P_T + s - P_N^*\right)$ \hspace{1cm} [Equation 25]

Which relates to the internal dimension of the economy? Thus, the equilibrium exchange rate ($\tilde{q}$) implies both external and internal equilibrium. This reflects the external dimension of the economy and the behaviour of non tradable goods relative to tradable goods across countries, (Balassa, 1964).

$q_1 = \left(P_N^* - P_T\right) - \left(P_N - P_T^*\right)$ \hspace{1cm} [Equation 26]

The foreign equilibrium is clear for the tradable goods market and is considered by the reaching of a required amount of net external assets. The historic version of the current account balance, which established any changing to the equilibrium, leads massive amount of net foreign assets. The current account balance ($ca$) on foreign asset holding ($nfa$), (Balassa, 1964).
In real terms the expressions of trade balance depends on the progress of the foreign real exchange rate namely, \( x = -\gamma q_x \) and the current account variations to the difference with current and necessary level of net external assets, so that a current account surplus would reflect the net foreign assets position below the desired level, (Mussa, 1984).

\[
ca = x + nfa \quad \text{[Equation 27]}
\]

\[
ca = n\left(nfa - nfa\right) \quad \text{[Equation 28]}
\]

The long run, \( nfa = nfa \), and the equilibrium external exchange rate can be defined as follows,

\[
q_x = r/\gamma \quad \text{[Equation 29]}
\]

Where the bars over the variables indicate the long run equilibrium values.

The internal equilibrium evolution of the internal real exchange rate is determined by the differences in behaviour of sectoral relative prices between countries, which in turn, are related to the evolution of sectoral productivities. Based on the productivity hypothesis (Balassa–Samuelson hypothesis), it can be shown that, (Balassa, 1964).

\[
\tilde{P}_N - \tilde{P}_T = \mu + \left(y_T - y_N\right) \quad \text{[Equation 30]}
\]
Where the \((y_{TN})\) are the average sectoral productivities, (Obstfeld and Rogoff, 1996) among others, for illustration of the Balassa-Samuelson hypothesis. Neglecting constant terms, it follows:

\[
\bar{q}_t = \alpha_N \left[ (\bar{P}_N - \bar{P}_T) - \left( \bar{P}'_N - \bar{P}'_T \right) \right] = \alpha_N \left[ (y_T - y_N) - (y_T - y_N) \right] = \alpha_N \bar{n} \quad [\text{Equation 31}]
\]

According to Balassa-Samuelson, (1993:115) argued that:

The producer\'s side tells that any increasing in the international competitiveness through policies that support traded goods sectors productivity, on the expense side, will increase nation national products and increase its standard of living, when compared with treating the sectors equally. Balassa-Samuelson effect might be one reason to resist this trade theory, because it predicts that, a GDP gain in traded goods does not lead to as much of an improvement in the living standards as an equal GDP increase in the non-traded sector, this is due to the effects prediction that the CPI will increase by more in the former case.

### 2.5.3. Edwards, Elbadawi and Montiel Theory

The production structure of the model is a key factor that affects the definition of RER in logical models; the mostly used modelling frameworks are tradable goods models, Mundell-Fleming model, the dependent economy model and importable-exportable goods model (Montiel, 2003).

The importable-exportable-non-traded goods model is appropriate for developing countries the model consists of exportable goods, importable and non-traded goods. The economy is small and open; there is a dual nominal exchange rate system and the government sector. The home country produces and consumes exportable and importable goods as well as non tradable goods and people of the domestic country hold
both domestic and foreign money, suppose that there is capital control and international capital mobility and assumes that the private segment inherited a given stock of foreign money, (Montiel, 2003).

\[ RER = f\left(GC, TOT, KI, TP, FDI, RES, TR\right) \]  

[Equation 32]

The essential part of Edwards (1989) model is the specification of the fundamental determination of the equilibrium RER. At this moment, it is worthy to search the dynamic path that the ERER follow in response to the disturbance in each of the exchange rate fundamental such as:

- **TOT**  
  Term of Trade;

- **GC**  
  Government Consumption;

- **TP**  
  Technology and Productivity;

- **TR**  
  Trade Restriction;

- **FDI**  
  Foreign Direct Investment;

- **RES**  
  Reserves and

- **KI**  
  Barrier of Enter.

To this end Edwards, Elbadawi and Montiel Theory has summarized the path in a very modern method, presented the following version of Edwards original outline, (Edwards, 1989), (Elbadawi, 1994) and (Montiel, 2003).
**Term of Trade (TOT)**

The important external RER fundamentals, measure the relative price of exports to imports and captures the influence of external demand and supply in the tradable sector. An improvement contributes to increases in real wages and that allows inter-sector shifts in mobile factors of production to the tradable sector, (Montiel, 2003).

The income effects of an improvement in terms of trade is that more is spent on all products, resulting in higher prices of non tradable goods, causing appreciation in RER. Thus substitution effects lead to a decrease in the prices of imported goods and services, falling demand for non tradable goods, hence depreciation of the RER. If the income effect associated with the TOT improvement is stronger than the substitution effect, an appreciation of RER will occur, otherwise the RER will depreciate. This renders the appropriate expectation of the impact of this fundamental on RER inconclusive, (Elbadawi, 1994).

**Government Consumption (GC)**

The tendency of the changes in ERER relation with adjusts in the GC needs to know the elements of the expenditure between tradable and non tradable goods. Once the most part affected in government expenditure is on the price of non tradable goods thereby consequential in RER appreciation, (Edwards, 1989).

The huge volumes of the rise in government expenditure is directly related with a tradable goods sector, then the relative price of non tradable goods go down follow on
RER depreciation. Due to unavailability of information on government consumption of non tradable, the researcher will use the ratio of total government expenditure to GDP as proxy in line with other studies (Edwards, 1989).

**Barrier of Enter (KI)**

Consider any limit or control that result in some barriers on free borrowing and lending of financial funds to and from the rest of the external market. A reply of capital controls may affect the equilibrium of the RER be positively or negatively. Illustrated the liberalization of capital controls which increases the inflow of capital, well leads to an increase in monetary base, resulting in prices of non tradable goods increasing in order to preserve internal balance hence resulting in appreciation of the ERER, (Montiel, 2003).

**Reserves (RES)**

An improvement in the quantity of external money is safety in the domestic economy is hypothetically predicted to valuation of the RER and a permanent regulation as the index of the reference to the power to prevent domestic currency and raise the safety of foreign currency having exclusive impact on the valuation of the RER, an decrease of the RER. The higher amounts of the external exchange rate leads a large portion of expenditure on the local goods, substantial to the tradable good and valuation the RER (Elbadawi, 1994).
**Foreign Direct Investment (FDI)**

Demonstrate how the changing in stage of foreign direct investment received by the local economy has an effect on the permanent ERER. In addition, a category of a household income equal to the level of transfer will increase on income thus leading to an expansion of consumption which, in twist, the price of non tradable goods and in the long run cause an appreciation of the RER, (Montiel, 1999).

**Trade Restriction (TR)**

Assume that a national position of a trade policy which demonstrate the existence of a level of degree and structure of quotas and import taxes. Trade restriction an increase of the price of local tradable goods and result on substitution and income effect. The substitution and income effects are dominant on the trade restriction and ERER, (Elbadawi, 1994).

**Term of Trade (TOT)**

The substitution effect occur on the trade restriction dominates the income effect. Thus contraction restrictions lead to higher volumes of increase in the price of non tradable goods thus resulting in real appreciation of the ERER. In other words, decrease in trade restrictions and there is also real depreciation of the ERER, (Edwards, 1988).
Technology and Productivity (TP)

The process of production involves a method or techniques and is a non-policy domestic category that generally increases productivity efficiency. The variable used to confine the Ricardian-Balassa-Samuelson looks on the technological and productivity expansion in the economies and tend to be more concentrated in tradable goods. The relative price level of tradable goods declines and ERER brings a signal in economy, Edwards (1988).

In summing up, the general equilibrium models of the RER have improved far better than the easy PPP and Balassa-Samuelson approaches. Nevertheless, these models have limitations. The gain from a particular sector will reflect on the current account and also affect the equilibrium of exchange rate and desired RER models. Other relevant limitation is the process of specifying and analysing the problems of inefficiency.

The usefulness of the models is manifested to developed countries and all the bases of the models are directly related to the Mundell-Fleming model that endogenize the foreign terms of trade. Furthermore, the models suggest higher level of output, low and sustainable level of inflation rate and natural rate of employment that do not reveal the true explanation in developing countries. The developing countries have shown a huge level of exogenous and depression policy and among other things, have raised a power to concern about the exchange rate misalignment (Montiel, 1999).
The useful of the PPP model has been considered to be main approach to established the level of association with a variables to determine the long run relationship and also used to measure the degree of misalignment. The lower performance of PPP joins with a higher level of pressing need for correct the estimation of the ERER has lead to the appreciation of the role of fundamental in developing countries, (Montiel, 1999).

For developing an inter-temporal general equilibrium approach of small open economy applying the relevant techniques expected to capture the logic features of the developing countries. The approach has been used in expansively to predict the exchange rate misalignment for most developing countries, Edwards (1989).

2.5. Related Studies

There is a lost context related to the exchange rate, some studies deals on the ERER on the economy and others on the exchange rate regimes and its impact on the economy growth rate. There have been assumed significant part in the research over the past periods and very few studies have been conducted to explain the behaviour of RER in Mozambique and other developing countries. In particular, there are no studies that have recently looked at an assessment of the exchange rate policy in Mozambique to sustain the economy.
The existing empirical literature, in general, subsequently illustrated that PPP is not a suitable model for the determination of the long run relationship for the RER because of the slow representative deterioration of RER to a constant level, long run equilibrium implied by PPP hypothesis. Finally, there has been a change a away from PPP-based method of the ERER the appropriate instruments and theoretically perspective, such as those by (Edwards, 1989), (Elbadawi, 1994) and (Montiel, 1999).

There are larger methods to standardize the groups of the studies according to several characteristics which are acceptable in a science and are based on: region, types of methodology are used, types of data and level of development in a nation. These incorporate categorisation by the type of analysis engaged, country by country analysis, cross section analysis and panel data analysis, and categorisation by country studies.

The categorisation followed in this review as it allows sensitivity to structural differences amongst these country groupings. This section is, thus, separated into empirical literature from developed countries and developing countries, and finally narrowed down to empirical literature from Mozambique.

2.5.1. Related Studies Developed Countries

In the study evaluates a model of RER to evaluate the determinants of RER used the cointegration method to get the run relationship. The model capture the productivity disparities, the effects of TOT, fiscal balance, net foreign assets and real interest rate differentials as the fundamentals and critical to determinants of RER, (MacDonald, 1988).
The research used multivariate approach and the model was applied to analyze the effects on the real effective exchange rate of the United States dollar, Yen and the Deutschmark, over the period (1974 to 1993). The results found evidence on the long run relationships within a variables and the model indicated all independents variables presented showing positive trends and increase in any of them leads to an appreciation of the RER.

A research was conducted on the RER and a specify test known as sheikh hypothesis. The long run relationship in this model was determined by the ratio of relative real unit labour cost of tradable goods among two countries, but the same study capital flow was added and was applied equilibrium in long run used the Engle and Granger methods were applied on the long run equilibrium and case study was on the Greeces and data was collected covering a period of (1960 to 1990), (Antonopoulos, 1999).

The study demonstrated that the changing on the RER cannot be interpreted by the PPP hypothesis, technological and productivity factors since production has an important effect on the export sector of Greeces vis-a vis the rest of the world and also has an implication on the financial market. The suggestion of the study was to create an improvement in the relative productivity of Greeces export sector and capital inflows appreciate the country RER, (Antonopoulos, 1999).
A study on exchange rate determination was carried out. The research used the data base from Britain, U.S, German U.S. and Japanese U.S. bilateral and the variables were output and level of relative price. The study distinguishes two different sources that conduct the exchange rate, such as, financial market and real economy, (Kempa, 2005).

The nominal uncertainty in the economy are measured as a sensible fact of money supply and money demand and aggregate supply shocks are measured with the level of production in industries sectors and the rate of domestic absorption and the level of elasticity of the current amounts used to substitute from the aggregate demand shocks, (Kempa, 2005).

The research study found out the nominal shocks account for less than 33 percent of overall RER variability and the remaining variability was accounted for by aggregate demand shocks, particularly at longer forecast horizons. The relevant suggestion of the study was the any anticipation of the changing in the exchange rate appears to be predominantly and the long run relation responses to the real shocks and any moderate instability in the financial market, (Kempa, 2005).

2.5.2. Related Studies from Developing Countries

Since the present study is done in Mozambique, the importance of the RER, from developing countries has led to several studies investigating its determinants and the behaviour and the expected result for these study are likely approximate by the nature of all developing countries in Africa having similar characteristics. These studies include Edwards (1989), Elbadawi (1994), Elbadawi, Aron and Kahn (1997), Asfaha and Huda

The pioneer carried the model of the determination of the RER for developing countries. The study was done in the area of exchange rate by bringing theoretical approach of RER determination and the method of estimation its long run associations within 12 developing countries ((Brazil, Greece, El Salvador, Columbia, Israel, India, Malaysia, Philippines, South Africa, Sri Lanka, Thailand and Yugoslavia). The conventional cointegration test was used on the time series data, (Edwards, 1989).

To evaluate the effects of relative significance of the real and nominal variables in the process of real exchange rate determination in the long and short run, the study used the RER as a function of TOT, GC, KI, Exchange Controls, TP, Domestic Credit, Real Growth, Nominal Devaluation and the method applied were cointegration of Engle and Granger technique, (Edwards, 1989).

The research found out that in long run equilibrium, one variable affected the long run associations between variables in the ERER and in the short run the equilibrium of RER is explained by both real and nominal determinants. The most relevant factors illustrated in the study that affecting the ERER were TOT, GC, openness, TP and KI. Furthermore the study goes on to analyze the implication of RER misalignment in the economic environment and the study concluded that the countries whose RER are closer to equilibrium outperform those with misaligned RER, (Edwards, 1989).
A study and model related to the determination of ERER, was done whose contribution was to add a relevant macroeconomics variables that have more impact on the economy and those variable that has more impact on the economy and those variable have a higher power to determine the ERER. The fundamental determinants of the long run ERER in the model include the terms of trade, openness, net capital flows in relation to national product, the government consumption in GDP, and the rate of exports and this study estimates model on annual data for Chile, Ghana and India, (Elbadawi, 1994).

The research founds in all three countries reported that the exchange rate and all the fundamentals recognized variables in the model are non-stationary on the natural level and after the first difference, all variables gets the stationary and co-integrated. Additionally, the qualitative signs of these fundamentals coefficients in co-integrating regressions are in accordance with theoretical predictions, (Elbadawi, 1994).

There was a study on the determinants of the Real Exchange Rate for South Africa during 1970-1995. This study investigated on the long run relationship, the model that considered RER, TOT, TR, KI, TP and GE and the used a natural quarterly data. The technique used in the study was the Engle-Granger cointegration test to determine the equilibrium real exchange rate and is obtained from theoretical model characterising equilibrium as the achievement of internal and external balance for sustainable capital flow and trade and tax regimes, and gone terms of trade, technology. The study considered all the regimes in exchange rate determination and the discussed the evolution of a broad range of theoretical economic fundamentals and short run policy factors which affect the undervaluation of real exchange rate, (Elbadawi, Aron and Kahn, 1997).
Another research string was undertaken on inter-temporal general equilibrium model of a small open economy, method used with Edwards (1989) to predict the degree of the RER misalignment and its impact on the international trade competitiveness of the South African economy for the period (1985-2000), (Asfaha and Huda, 2000).

The purpose of this research was active single model equation error correction model of a first order autoregressive distributed lag model, Augmented Dick Full (ADF) test, and five years was consider to obtain moving average techniques to estimate the exchange rate misalignment, (Asfaha and Huda, 2000).

This study went on also use the effect on the impulse response analysis and variance decomposition techniques of a co-integrated Vector Autoregressive (VAR) have been established to measure the impact of the misalignment on trade competitiveness, (Asfaha and Huda, 2000).

The study showed that manipulation of the RER had been consistently overvalued during (1988:3-1988:2) the Rand had been undervalued. Furthermore the research noted that the effect on the exchange rate misalignment denoted in South Africa on the trade competitiveness accounted for 20 percent of its deviation, (Asfaha and Huda, 2000).

A study focusing on the relevant determinants of the RER in Zambia was done. The study illustrated a model of production structure based on the three variables and used co-integration analyzes in estimating the long run determinants of the real exchange rate for trade balance (import and export) and of internal real exchange rate, (Mkenda, 2001).
The result of this study demonstrated evidence on the decline of TOT and GC and level of depreciation of the RER for imports, while an increase in investment share of local products appreciates the RER for imports, a decrease in TOT. An increase in central level of reserves and trade taxes appreciate the RER for exports in long run, in the long run, the internal RER is strengthened by a decrease in the TOT and an increase in investment level also on the rate of growth of real GDP, in short run, although, aid and openness depreciate the RER indices, (Mkenda, 2001).

Another study that deals on the estimate the equilibrium real exchange rate for Middle East and North Africa (MENA) was undertaken. Countries were considered as significant and permanent overvaluation of their currency and the period of study was (1970-1980) and that this overvaluation has had a cost for the region in terms of completion with a nations, (Nabli and Veganzones, 2002).

The research concentrated on the indicator of misalignment based on the estimation of an equilibrium exchange rate following Edwards (1988) and the study assumed a panel of 53 countries, where 10 of them were the MENA economies. While overvaluation increase at the beginning period of research and decreased in the 1990s, perhaps due to flexibility regime in determine the exchange rate in some MENA countries and better macroeconomic management in others, misalignment nevertheless remains higher than in other regions, (Nabli and Veganzones, 2002).

This was explained by the economy reforms in the adopting the flexible regimes to determine the exchange rates. The estimation model for export illustrates those industries exports have been significantly affected by the overvaluation of the exchange
Rates. Countries that had already have more diversified economies benefited most from
the decreased overvaluation in the 1990s and the nations also saw the persistent
increased on the diverse industries exports during 1990 as a resulting from considerable
decline in exchange rate misalignment, (Nabli and Veganzones, 2002).

A study that centred on the estimation of the ex-post ERER from Zimbabwe using
quarterly data over the period (1990-1999) was instituted. The techniques and method
used to bring the possible signal for the Zimbabwe economy were very suitable since
they integrated the long and short run associations (cointegration) in relation to the
crucial influence of the RER in the long run and drives the ERER as well as the Error
Correction Model (ECM) to model the short run adjustment process, (Dhliwayo, 2002).

The method used to examine the relevance of real exchange rate using Johansen co-
integration, appropriate view to estimate the ex post ERER. The research took into
consideration on the most relevant variables mentioned earlier (Edwards, (1988)), terms
of trade, import tariffs; fiscal deficit and technological progress and concluded estimate
results indicated the relevance of the equilibrium exchange rate model, (Dhliwayo,
2002).

The evidence signal provided by the model and the magnitude of the estimated
coefficients have verified the model assumed but also the estimation results on
misalignment confirmed by the exchange rate. The study concluded that given
framework of estimating currency misalignment can be used as a useful policy in
Zimbabwe, (Dhliwayo, 2002).
The Johansen's cointegration approach study, was done based on the determinants of real effective exchange rate (REER) for Brazil, from (1994 to 2003), supported by standard approach model and method and techniques used to run the model was fundamentals Johansen co-integration approach, (Buchs, 2004).

The results from this study showed that the long run behaviour of the real effective exchange rate could be interpreted by the relative productivity differentials, real commodity prices, and government expenditures on tradable and non tradable goods, trade openness and real interest differentials. Furthermore, the level of misalignment of the real exchange rate was found to be unpredictably modest during the period (1994-1998) and by the end of 2003, the real exchange rate was found to be a little, but appreciated with respect to the estimated equilibrium level, while the extent of the level of misalignment appeared to be small as well, (Buchs, 2004).

A study was undertaken that used the Balassa-Samuelson effects to explain the equilibrium of the long run association and its behaviour of the real exchange rate in developing countries and the research demonstrated the evidence based on this issue based on a panel data sample of 16 countries, (Choudhri, and Khan, 2004).

Observation from this study was that the traded-non-traded productivity differential was a major determinant of the relative price level of non traded goods, and the relative price level in applies a considerable effect on the real exchange rate. The terms of trade also affected the real exchange rate. These findings confirmed the long held views on the Balassa-Samuelson effects for developing countries, (Choudhri, and Khan, 2004).
A study on Turkey on ERER was done. Engle-Granger cointegration and Error Correction methods were used to investigate the long and short run determinants of RER and the information applied in the research was quarterly data, over the periods (1990 to 2004), (Sexana, and Atasoy, 2005).

The study findings was that the national currency of Turkey (Lira) was really overvalued before the crisis in 1994 and 2001 and the actual RER was at present close to the equilibrium level, revealing the proliferated by the Turkey exporters that the domestic currency overvaluation is responsible for Turkey’s uncompetitive exports, (Sexana, and Atasoy, 2005).

Another study on Pakistan about the ERER that used annual data from (1978 to 2005) was carried out. This study used method and techniques the Engle-Granger cointegration based on (Edwards (1989)). The result of the study illustrated that, ERER is determined in terms of trade, trade openness, net capital inflow, relative productivity differential, and government consumption and worker remittances, (Hyder and Mahboob, 2005).

The study also presented the persistent undervaluation of the real exchange rate which were caused by terms of trade due to the passive export and the estimation results denoted that in long run associations the ERER and degree of exchange rate misalignment revealed the effect of misalignment within a of ranges -11.1 to 20.1 percent with zero deterioration mean (1978 to 2005), (Hyder and Mahboob, 2005).

The long run convergence tendency of actual EREER towards EREER in Pakistan and a
little depreciated in the range of 1.8-2.4 percent on the basis of two estimated regressions while one equation shows an appreciation of 2.0 percent relative to EREER. Other results reflected that the exchange rate misalignment and its volatility in EREER considered by model divergence tended to be smaller in flexible exchange rate regime as compared to other critical exchange rate regimes, (Hyder and Mahboob, 2005).

The centre of the study was to show the evidence of RER misalignment in Namibia during the period (1970 to 2004) and to determine the ERER by assuming the relative variables presented with the model, such as, RER, trade and exchange restrictions (openness), terms of trade and the ratio of investment to GDP and RER as a dependent variable and others are independents, (Eita and Sichei, 2006).

The method used to come up with the results was Johansen cointegration approach to investigate the existence of integration relationship between the RER and the fundamental variable in a bid to estimate long run relationship. The research founds that a change on the openness (competitiveness) and ratio of investment to GDP implied the real exchange rate to appreciate moderately and the RER continued appreciated for almost the estimation period. It reached its equilibrium value in 1998. It is significant to monitor real exchange rate, and guarantee that the deviation from the equilibrium value is not considerable, (Eita and Sichei, 2006).
2.5.4. Related Studies from Mozambique

There are very few studies that have analysed the ERER in Mozambique, the period after transformation of the Mozambican economy remains largely ignored. The only study that has investigated the ERER of the MZM to USD is the study done by IMF (2001).

In its report, IMF estimated the equilibrium exchange rate for Mozambique, based on Balassa-Samuelson, through the Johansen cointegration test on 15 years. The analysis was conducted using monthly data of real effective exchange rates, foreign assets and relative sectors prices. The results indicated that overall, the equilibrium exchange rate shows a protracted period of appreciation, from December 1993 to January 1998, followed by the period of stability from (1998 to 2000), (IMF, 2001).

This behaviour reflected, partly, an improvement in net foreign assets position, in particular for the period before January 1998, which in turn, could be mainly related to the big inflow of foreign aid during that period. It also showed the pattern of productivity in tradable goods sector with the respect to the non tradable ones, as presented by the ratio of non tradable to tradable goods price, (IMF, 2001).

The fluctuations portrayed exchange rate around its equilibrium which remained within a range of 7 percent over the entire period. The most protracted period of apparent overvaluation started in July 1997 and lasted until October 1998, confirming the concern, expressed at the time, that the Mozambican economy was suffering from lack of competitiveness and justifying the fact that the authority had pursued a floating

By the end of 1998 onwards, the real effective exchange rate started depreciating moderately, as the central bank refrained from intervening in the foreign exchange market. In April 2000, the real effective exchange rate appeared to be undervalued by about 3 percent. The speed of adjustment with exchange rate approach its equilibrium, as measured by the half life adjustment that is, the time needed to correct the disequilibrium by 50 percent is estimated at about five months, (IMF, 2001).

Having presented the relevant studies, it is very complex to summarise empirical literature review on this particular issue, exchange rate determinations since the context and method used and economic environment to determine the RER, has been considered by previously researchers and had estimated these fundamental models based on the three theories: PPP, Balassa-Samuelson and Edwards (1988), Montiel (2003) and Elbadawi (1994).

The structure model is crucial to estimate the ERER, although all selected variables used to their different situation and it beating to come away from the huge literature faced in this part without more than a feeling that the central determinants of the long run RER in developing countries include changes in the TOT, TP, GC, TR and real interest rate disparities vis-a-vis trading partner countries, Montiel (2003) and Elbadawi (1994).
The variables such as the international transfer and capital flows and net foreign assets. Having any influence on to determine the exchange rate, although shock nominal variables, such as change in monetary and nominal variables exchange rate policies, may cause the RER deviate from its long run path, but the effects will only be transitory. Thus, the RER is determined by both real and nominal variables in short run, while only real variables influence the RER in the long run, Montiel (2003) and Elbadawi (1994).

2.6. Chapter Summary

This chapter provided a trend of the exchange rate models and empirical studies. The models a convergence of thinking among all the actors and they are correlated. PPP model the central idea is demonstrated the relationship between the exchange rate and the price level and the equilibrium of exchange rate, that occurred when their domestic purchasing powers at that rate of exchange are equivalent and the model is useful because the amount of goods a currency can purchase within two nations often varies drastically, based on the availability of goods, demand for goods, and a number of other goods are difficult to determine factors.

PPP model brought a excellent contribution and challenges to the economy in term of bring the trade within a countries and without considering the non tradable goods, the model also assumed perfect substitution effect with goods in economy which is not linear and the model are not think about none economics factor in the determination of the exchange rate, such as political stability frequently in developing countries, other relevant macroeconomics variables, natural phenomenon and social aspects.
Once the PPP presented the assumptions those tradable goods determine the nominal exchange rate between two countries, that both countries produce tradable and non tradable goods, that wages equalize between sectors but not between countries, and that more developed countries enjoy higher productivity than less developed countries in the tradable sector. Another factor that leads to deviation from the PPP is the lack of perfect substitution between tradable goods in two different countries.

Balassa-Samuelson model was based on a tradable and non tradable to determine equilibrium was clear that the tradable goods market was characterized by the achievement of a desired stock of net foreign assets.

The essential part of Edwards (1989) and Montiel (2003) model is the specification of the fundamental determination of the equilibrium RER. At this moment, it has worthy to search the dynamic path that the ERER would follow in response to the disturbance in each of the exchange rate fundamental such as $TOT, GC, TP, TR, FDI, RES$ and $KI$. To this end Edwards, Elbadawi and Montiel Theory has summarized the path in a very sophisticated method, presented the follow version of Edwards original outline.

This model showed more adjusted to PPP and Balassa-Samuelson models are represented in this essential models and brings more components in term of explaining the exchange rate, such as government expenditure, foreign direct investment, reserves, trade restrictions, term of trade and technological and productivity which is relevant in term of stability of economic growth and sustainable.
This chapter revealed that most of the empirical studies applied these models also presented in the study which provide good evidence to the research and in general the empirical studies used by Edwards, Elbadawi and Montiel.
CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This chapter presents the research methodology for the present study. It explains the research objectives and a suitable methodology to achieve those objectives. The objectives of this study were to analyze the assessment of the real exchange rate in Mozambique for the sustainability of the economy, during (2000-2010). This involved a comprehensive study of the macroeconomics behaviours and details of the exchange rate policy handled and its implications for the economy.

The comparison of these dimensions across the other variables was the identification and exploration of the nominal and real prices, term of trade; government expenditure, Trade Restriction, capital invested, foreign exchange reserves, trade restriction and trade policy. This was done by factors through field and sustainability of economy.

The effect of the macroeconomics variable behaviours and the exchange rate policy was studied through regression analysis. In addition the study also assessed the impact or the signals of factors that on the success and the performance constructs of success namely to the economy, budget, schedule and quality separately.

The research took a triangulated and validation model; employed qualitative and quantitative approach through four case studies and the analysis of data was undertaken used EVIEW 3.1 and EXCEL WINDOW 8.0. The research methodology has to be robust in order to minimize errors in data collection and analysis. This chapter describes the
steps of run the long run relationship between the variables presented in the Montiel, Edwards and Elbadawi model and the, instrumentation done for the study, data collection, and data analysis procedures of the entire study.

The types or a model of research that fit or adapt to the problems and theories under investigations have a dilemma and the objectives of the research will make a decision which of these options will be used. Qualitative research, first approach used in research to conduct the social studies because by nature of data, the process of collecting data, the mechanism of organizing and analysing the data and nature of data tell us about our subjects of study. Those are the conditions for dealing with the qualitative approach in research and all the understanding having from this kind of research are much more informative compare with a quantitative approach.

The qualitative research is one type of research that is considered superior between a quantitative research and this approach is more clarify so as to create or brings new information. The qualitative research focus on importance, definition, characteristics, people, interactions, cultures and experience, in addition the qualitative research works on the process of describe the behaviour of particular variables. As one leading promoter of qualitative methods has explained, Quality refers to the what, how, when, and where of a thing ï¬ its essence and ambience, (Tewksbury, 2009).
Qualitative study concern on the implication, importance, causes, concepts, classification, explanation, metaphors, symbols, and descriptions of things. The omitting of the concept is expressed amounts or quantity and the numerical descriptions of goods or objects and their associations is not a qualitative approach and if the elements of the study centre on numerical perspective, the form of research is a social science research but the form is quantitative methods, (Berg, 2007).

Quantitative approach is frequently considered to more scientific approach than the quantitative approach because what is social is a science. The target is on applying conceptualization and carefully with the definitions of the variables. A qualitative approach emphasis on the analyzing and interpretation which brings a full pictures of the context, environment and the way of understanding of concepts, (Berg, 2007).

Qualitative methods emphasis a depth of perception of subjects that is not possible through the use of quantitative, statistically-based investigations. Qualitative methods are the techniques that focuses and places primary value on complete understandings of how people (Social aspect) comprehend, practice and work within their environment that are dynamic, and social in their foundation and structure, (Pearce, 2002).

According to Worrall (2000: 354):

One reason that quantitative research enjoys widespread heightened respect in the discipline lies in the predictive advantages this method of inquiry possesses. Indeed, the ability to make correct predictions is one of the more outstanding characteristics of quantitative methodology. Of course, to make such a claim Worrall (and other like-minded scholars) have to work from the assumption that prediction is necessarily a quantitative task.
The certainly measure that can show us the past and current moment in the social version of life and use what is and has been as a basis for predicting what will be, to do so does not need any statistical and mathematics testing. The level of prediction what is today and tomorrow will be on our own qualitative sympathetic of the situation and interaction communication find ourselves not free in on a daily basis.

The prediction having a weight and it will be against the statement presented by Worrall and others that we need to identify power of relationships so as to know how likely things are to be predicted accurately. Obviously, this way of thinking it’s one view but another way of achieving such a goal, and not essentially a superior means for achieving such a goal, (Worrall, 2000).

The ability to predict what is going to happen is recommended as a central to the (apparently superior) value of quantitative model, those who suggest such a view also find it significant to defend against the fact that the efficiency of prediction in social sciences and is marginal or fragile at best. Prediction is based on hypothetical grounds, and the testing of hypothetical concepts, propositions and associations, (Worrall, 2000).

The theories are the product of qualitative research; qualitative research creates the concepts and proposes the theories that are used to launch tests and predictive models. However, this fact, that qualitative research provides the foundation for theoretical understandings is turned back on qualitative research as a weakness, demonstrating its less appealing, (Worrall, 2000).
The qualitative study is also marginalized and minimized in consistency, although in minds to compares with quantitative study supporters. The role of game in progress of the theory, qualitative is significance research for a theoretical perspective in improvement and it is therefore secondary in importance. Qualitative research will stay secondary as larger as it excels, whether purposely or not, at fixing the conceptually level for quantitative discussion, (Worrall, 2000).

Actually the groups association of knowledge and the tendency of the quantitative research could advance is not relevant or acceptable as this approach now is the measure of goods or things and Just to be clear that it is not probable to see the lower predictive on the demonstration ability by quantitative research and it is also having such failures are the outcomes of the procedures to come up with the prediction. Although, prediction failure and the method where linked between the quantitative research and policy is weak because by the theory not to the method, Worrall (2000).

The more significant is three significant than the seed from having it grow, however so too should the seed be responsible when the tree fails to thrive and provide fruit, defender defenders of quantitative analysis. Although, as those who have been trained in qualitative methods recognizes when the research does provide valuable insights and advances to knowledge, (Worrall, 2000).

The assistance of qualitative research diverges from other school of research, however the giving of the model is differing and this is not to mean that one is equally to the other. Qualitative methods bring understanding and knowledge that complements the process of the quantitative research. In this regard, this thesis used quantitative
approach, since qualitative methodology referred to the exploration process and in the sense of understanding the aspects of the social structure whether have been appropriated explored and shows the centre of the elements of the structure connections.

The investigator of qualitative studies lack the skills to predict or estimate the relationship between the variables, but qualitative researcher can propose and discuss in support of particular customs and views of the surrounding personal relations. These concepts and conceptual relationships, then, are based on theories to explain the phenomena under study, (Worrall, 2000).

The quantitative approach is a technique focused on numerical analysis and endurance test and persistence of associations between variables and relationships between different measures. Specify exactly how two or more variables, is very narrow concepts of limited value clear and consensus between the environments, but often worthwhile only for very accurate measurements of precisely defined issues, concepts and variables. As such a quantitative approach, based on the quantitative techniques utilize to some variables which are defined, (Pearce, 2002).

Quantitative research is different from that qualitative research does. However, the important difference is that the quantitative researcher needs to understand the estimators of the variables under investigation before accepting the study. Qualitative researchers explore the extent and scope of concepts (eg, age, weight, income, prices and revenue) through the collection and interpretation of information process. It is through the study of a qualitative nature that the definitions of concepts are recognized and discriminated process, (Pearce, 2002).
The quantitative approach adopts the position of the researcher, and defines each variable forms clearly and coherently, outside the scope of the definition of culture and behaviors, individuals and groups being studied. The qualitative researcher operates based on assumption that the terms are contextually and resulting quantitative researcher works on the assumption that he knows best and dominates which means a concept, and can recognize different ways of measuring these concepts, (Pearce, 2002).

Recognizing the merits that the effect of power that quantitative research can associate and even assist or boost the qualitative research and multiply the benefit of knowledge production and is subject to a search or applying based on the use of research methods, along with interviews and observation may be especially beneficial and impressive in the development of theoretical concepts, (Pearce, 2002).

When the researcher moves back and forth between each type of data and data structure that applies different approaches and relies on each to inform the process and proper techniques, particular focus issues and others, there can be successive and significant improvements and advancements of the different deeds and accomplishments, providing a much more well rounded understanding and objectives of a particular character or context of a research, (Pearce, 2002).

3.2. Research Method

The exploratory and descriptive research design was adopted due to the nature of the study. Exploratory research provides insights into and comprehension of an issue or situation. Exploratory research is a type of research conducted because a problem has
not been clearly defined. The exploratory research helps to determine the best research design, data collection method and selection of subjects. While descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied (Pearce, 2002).

Descriptive research answers the questions who, what, where, when and how. Thus, on the basis of the above, the two research designs were appropriate for the present study as it was important to gauge the various project specific risks that impact the software projects and also understand the dynamics of organizations climate on these software projects.

3.3. Population of the Study

The target population of this study was the groups of different members, those that have influence on the exchange rate policy. In the current context of the economic structure of Mozambique, the choice of this group of studies, the effects contribute to the following critical factors. The population for this study including the followings:

- Central Bank of Mozambique officials and vital and principal makers of monetary policy, which adds the policy of exchange, which somehow need to interact to glean elements and bases that determine the exchange rate of the economy of Mozambique.

- Financial Institutions, the intermediation of monetary policy actions are performed by financial institutions such as commercial banks and finance
companies, the scope of coverage of the Mozambican financial system responsibilities of these institutions is thus directly affect the exchange rate.

- Economic Agents: Responsible for increasing production and need to produce the capital, who in turn rely on bank financing with a view to sustainability of their activities, thus influencing the exchange rate policy.

- Ministry of Finance: This area represents the action of the government overseeing its goals and growth of the economy, coordinated activities.

- Megas Projects: High levels of foreign investment capital in the form of application of high levels of capital for the exploitation of resources that clearly affect the Mozambican economy and exchange rate policy.

3.4. Empirical Methodology

Macroeconomic variables are a key feature in the matter of its tendency and that data structure always tended to grow and improve and not assuming stability over time, so by the unit root test we analyze the foundation of stability. Augmented Dickey-Fuller (ADF) test, the recent focus on applied work emphasized the integration as appropriate macroeconomic dynamics modeling of these variables.

The perception of long-term relationship is that it allows us to capture the equilibrium relationships dictated by economic circumstances between non-stationary variables inside a static model. Current studies focus on applied techniques emphasized balancing
long-term and short-term optical Engle-Granger as feasible and appropriate these variables, dynamic macroeconomics modeling (Gujarati, 2003).

Studies with the support of use of related variables, such as linear relationship between fundamental variables are stationary use as a means or condition that supports association effects. If such a combination of stationary be present, the significance of relationship variables possess long and short term they can be cointegrated, even if they themselves are not stopped by and they are clear relationship or long term association. The study argued that has more than two stationary variables cannot be integrated, which is the ratio of long-run equilibrium between the variables, (Montiel, 2003).

Through the error correction model (ECM) the method used to assign the short run behaviour to the long run based on the error term, residuals, which is a limited variance that is designed for use with non-stationary series that are known to be co integrated, one can confine the long run behaviour of the non-stationary explanatory variables to converge to their co integrating relationships while allowing extensive range of short-run actives.

The study has two main purposes, first to identify the Equilibrium Real Exchange Rate activities and to evaluate the real exchange rate as appreciated or depreciated in Mozambique during the period 1991:1 to 2004:4. The number of econometric tests were due, since spurious regression is prevented while a trustful and meaningful regression is the ultimate target. The analysis assumed to attain the two purposes is not different, namely test for stationarity, cointegration test and ECM.
The dispute in advance econometrics is to identify the long run relationship among variables so that forecasting is allowed, but this face is constrained by stationarity of data or variables. A stationary process is said to be stationary if it is mean and variance is constant over time and the value of the covariance between the two periods depends only on the space or gap or lag between the two time periods and not the actual time at which the covariance is calculated, (Gujarati, 2003).

In short, a time series is stationary if its mean, variance and autocovariance, at various lags (the period of effect on manipulated variable have action), continue to be the same no matter at what point it is measured the equilibrium real exchange rate. Such a time series will tend to return to its mean, that is mean reversion and fluctuations around the mean, which is measured by its variance will have a broadly constant degree.

Stationarity subject is very serious when dealing with time series. A process is said to be stationary, when it is integrated of order zero I(0) and when a process is non stationary it means that time series will have a time changing mean or time changing variance or both, consequently in order to answer the non-stationarity problem, the time series are differenced two times it is said to be integrated of order 2, I(2) and if time series are differenced once it is said to be integrated of order 1, I(1) and if differenced series are the mostly used ways in econometric analysis to test for stationarity of a time series, (Gujarati, 2003):

- **Visual Examination:** consists in plotting times series in a line graph and pay attention to both the mean and the variance of a variable. If the series is
increasing or decreasing dramatically over time, it means that the mean is not constant and therefore the series are non-stationary, (Gujarati, 2003).

- **Correlogram**: a more careful test for stationarity needs the use of correlogram. Attention should be paid to Autocorrelation term (AC) when a variable tends to be zero as the length of the lag increases. If the AC tends to be zero fairly rapidly, the variable is stationary, but if they are considerably different from zero then they are non-stationary, (Gujarati, 2003).

- **Augmented Dickey Fuller (ADF) Test**: this method evaluates the hypothesis that the variable in question has a unit root, as a result, it is likely to gain from being expressed in the first difference form. Based on this test the ADF test statistic must be greater negative than the critical values at 1 percent, 5 percent or 10 percent levels of significance, so that it can be said that the variable is stationary in the contrary non-stationary, (Gujarati, 2003).

An additional issue that is very critical, when concerting the stationarity test, principally when applying the ADF unit root test for stationarity is the lag length criteria. When one macroeconomic variable changes such as GCN, FDI, TOT, TR, TP, RES, the result is not immediately reflected in another variable, say RER, instead it takes time. As a result there is a need to incorporate the issue of lag length criteria. According to Dickey-Saïd the lag can be obtained from formula 3.1.

\[
\text{Lag} = \frac{3}{\sqrt{n}}
\]

[equation. 35]
In the study, two stationarity tests were carried out, the observation method while it is very useful and easily applied and ADF unit root test because it is the most applied one. The critical value used for ADF unit root test was 5 percent because a 95 percent level of confidence is excellent; although 1 percent and 10 percent are left aside. The lag used is 4 and it was obtained applying in equation 35. The correlogram issue was left since the approach requires that autocorrelation and partial correlation should die quickly and this could be biased.

3.5. Cointegration Test

In advance method, when agreeing with time series, the past practice is to avoid spurious regression (Regression or model which is not recognized by the assumptions of linear regression model). If the underlined time series are non-stationary, the first difference should be taken in order to get stationarity. This option, despite giving a result for the problem, has its own inconveniences, may change the fundamental theoretical meaning of the differenced variable and throw away the information about the long-run trend of the variable, (Engle and Granger, 1998).

In order to avoid losing critical information about the variables being used by taking the first differences to correct for non-stationarity, the concept of cointegration is used. This technique consists of matching up the degree of non-stationarity of the variables which are only variables integrated in the same order could be analyzed together, in a way that makes the residuals of the equation stationary and liberate the equation of any spurious regression results, (Engle and Granger, 1998).
The concept of cointegration reveals the existence of a long-run equilibrium to which an economic system converges over time. By definition, cointegration refers to two or more series that even though the series themselves may be non-stationary they are linked to form an equilibrium relationship spanning the long run (Gujarati, 2003). Mathematically, the cointegration relation is given by

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n + \epsilon_t \]  

[Equation 36]

Where:

- \( Y \) is the dependent variable
- \( X_1, X_2, \ldots, X_n \) are the independent variables.

The formal test for cointegration requires that the residuals, of say two I(1) series are I(0). This approach examines the cointegration or long run relationship between variables by looking to the stationarity of residuals. Once the residuals are stationary or integrated of order 0, the variables are said to be co integrated, and this method is known as the Engle and Granger cointegration technique.

### 3.6. Error Correction Mechanism (ECM)

The long run relationship between variables does not reject the existence of disequilibria for the short run. ECM is the method used to assign the short run behavior to the long run based on the error terms. This process is attained by computing the change of the dependent variable against the changes in the independent variables and a lagged error term. The coefficient of the error term should be negative, that is, the lagged error term
must be negatively related to the dependent variable. The absolute value of the coefficient of the lagged error term or residual indicates the speed at which equilibrium is restored by the equilibrium short run relationship (Gujarati, 2003). Mathematically, the ECM is given by

\[ \Delta Y = \beta_0 + \beta_1 \Delta X_1 + \ldots + \beta_n \Delta X_n + (1 - \alpha_1) \text{RESIDY}_{t-1} + \epsilon, \quad [\text{Equation 37}] \]

Where:

- \( \Delta Y \) is the difference of the dependent variable,
- \( X_1, X_2, X_n \) are the differences of the dependent variables,
- \( (1 - \alpha) \) is the speed of adjustment and
- \( \text{RESIDY}_{t-1} \) is the long run residuals with one lagged period.

### 3.7. Model Confirmation Tests

The model confirmation tests are crucial in order to evaluate if the results obtained are feasible and at which degree the results do not suffer from any biased regression. These tests were accepted because the regression is based on ordinary least squares (OLS) and then there is a need to declare that the assumptions underlying the OLS method are not despoiled. A number of tests can be undertaken to verify the coherency of the model like the Normality test to identify whether the residuals follow the normal distribution and the Autocorrelation (ACF) that bounds the residuals between intervals in order to measure the goodness or fitness of the model. The formula to calculate the ACF is given by

\[ \text{ACF}(k) = \frac{\text{Cov}(\epsilon_t, \epsilon_{t-k})}{\sigma^2} \]
In that the research design engages the following steps:

- Stationarity tests using both the observation method and the ADF unit root test for stationarity. For ADF unit root test for stationarity the critical value used was 5 percent. Concerning the lag extent, applying formula view 3.1, the lag used is 4. If the variables are stationary or I(0) there is no damage in moving to the next step, but if they are non stationary there is a need to differentiate them, once or two times as long as they between macroeconomic variables and avoid spurious regression. The cointegration achieves stationarity, and then progress to the next step, Engle and Granger (1998).

- Cointegration test to find the long run equilibrium relationship between variables is reached once the residuals are stationary. This test is useful to identify the equilibrium of the real exchange rate in Mozambique (Engle and Granger, 1998).

- ECM to identify the short run relationship between the macroeconomic variables. The variables may have a long run relationship, but the short run disequilibrium may be present, and ECM is useful to identify the speed of adjustment that is the period taken to achieve the equilibrium. The speed of adjustment is observed from the residuals coefficient that should be significant and pessimistic (negative), (Gujarati, 2003).
Validation of the model using two methods. First the normality plot of the residuals with attention to the probability and the ACF of the residuals. If the normality plot presents a bell formed histogram, therefore one can end that the residuals are normally distributed and the model is good or fit. Decision rules of normality assumption test, if the probability is below 5 percent then the null hypothesis that the residuals are normally distributed will be rejected and the other hypothesis will be accepted. The ACF should not be outside the calculation; otherwise the model cannot be considered good or fit, (Gujarati, 2003).

3.8. Data Collection Instruments

The target groups of the study were Staff representative for the institutions, focus on the groups represents were be kept deliberately small, with about 1 to 3 people so that its members feel comfortable but can express opinions freely. In-depth interviews: participants were interviewed individually, frequently in their institution to encourage participants to express their views.

The assistant was assigned with data collection activity. Data obtained from the participants was on how the exchange rate policy affect the economics growth rate in Mozambique, how it has affected economics growth rate in Mozambique and how affect their company performances in general. The researcher or assistants would always chair the group, to ensure that a range of aspects of the topic are explored.

In depth interviews were used using the same principle as a focus group; they were
face-to-face interviews. Data presented and interpreted by comparison, implications, suggestions and observations. The study used table, graphics and figures representations and the plan for analyzing the data might be done question by question, confronting data with the review of literature. It involved continual reflection about the data supplied by participants. Validity, is seem as a strength of qualitative research, but it is used to suggest determining whether the findings accurate from the standpoint of the researcher or the participant.

Quantitative data analyses at this study was primary classify things, persons, events and properties which characterize them. It will use many categories or codes as possible. Qualitative research is fundamentally interpretive. This means that the researcher develops a description of an individual or setting, analyzing inductively data for themes or categories, and finally makes an interpretation of the data, (Creswell, 2003, 2007; Yin, 2003).

3.9. Assumptions of the Study

This assumed that:

- All people who were been interviewed understand either English or Portuguese or both;

- The selected participants will be available and willing to supply accurate information on the asked questions;
• The researcher assumes that the regime of exchange rate is floating because in Mozambique economy, the policy of exchange is determined by the demand and supply.

• The research method and instruments used to fit the theoretical and conceptual frameworks chosen and questions asked were be appropriate for the level of understanding of the respondents,

• The characteristics of this study, quantitative data are for this research since the macroeconomics variables are incorporate; as a result secondary data was used. The study collected data from the following:

  ✓ Export (X),
  ✓ Import (M),
  ✓ GDP,
  ✓ GC,
  ✓ FDI,
  ✓ RER,
  ✓ Real GDP,
  ✓ Mozambique NER,
  ✓ United States of America Nominal Exchange Rate and Mozambique national reserves. This other data was collected from Central Bank of Mozambique statistical bulletins, IMF reports and from different sources.
Table 3.1: Secondary Data Collection

<table>
<thead>
<tr>
<th>Year</th>
<th>Export Million in USD</th>
<th>Import Million in USD</th>
<th>GC Million in MZM</th>
<th>NER Billion in MZM per USD</th>
<th>GDP Billion in MZM</th>
<th>CPI MOZ Percent</th>
<th>Real GDP MOZ Percent</th>
<th>CPI USA Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>126,40</td>
<td>877,50</td>
<td>692,80</td>
<td>1.038,15</td>
<td>1.340,70</td>
<td>0,40</td>
<td>0,0510</td>
<td>1,39</td>
</tr>
<tr>
<td>1991</td>
<td>162,30</td>
<td>898,80</td>
<td>958,30</td>
<td>1.845,40</td>
<td>2.056,30</td>
<td>0,33</td>
<td>0,0650</td>
<td>1,45</td>
</tr>
<tr>
<td>1992</td>
<td>139,30</td>
<td>855,00</td>
<td>1.490,10</td>
<td>2.742,14</td>
<td>4.757,00</td>
<td>0,45</td>
<td>0,0860</td>
<td>1,50</td>
</tr>
<tr>
<td>1993</td>
<td>131,80</td>
<td>954,70</td>
<td>2.286,70</td>
<td>5.238,39</td>
<td>7.829,00</td>
<td>0,42</td>
<td>0,0680</td>
<td>1,55</td>
</tr>
<tr>
<td>1994</td>
<td>149,50</td>
<td>1.018,50</td>
<td>4.097,40</td>
<td>6.552,50</td>
<td>13.145,00</td>
<td>0,63</td>
<td>0,0700</td>
<td>1,58</td>
</tr>
<tr>
<td>1995</td>
<td>174,30</td>
<td>727,00</td>
<td>5.162,00</td>
<td>10.776,00</td>
<td>21.590,00</td>
<td>0,55</td>
<td>0,0330</td>
<td>1,62</td>
</tr>
<tr>
<td>1996</td>
<td>226,10</td>
<td>782,60</td>
<td>6.579,80</td>
<td>11.295,00</td>
<td>32.093,00</td>
<td>0,80</td>
<td>0,0680</td>
<td>1,67</td>
</tr>
<tr>
<td>1997</td>
<td>230,00</td>
<td>760,00</td>
<td>9.521,00</td>
<td>11.604,00</td>
<td>39.693,00</td>
<td>1,01</td>
<td>0,1110</td>
<td>1,70</td>
</tr>
<tr>
<td>1998</td>
<td>244,60</td>
<td>817,30</td>
<td>10.140,00</td>
<td>12.366,00</td>
<td>46.427,00</td>
<td>1,00</td>
<td>0,1260</td>
<td>1,74</td>
</tr>
<tr>
<td>1999</td>
<td>283,80</td>
<td>1.090,00</td>
<td>12.815,00</td>
<td>13.218,00</td>
<td>51.913,00</td>
<td>1,06</td>
<td>0,0750</td>
<td>1,77</td>
</tr>
<tr>
<td>2000</td>
<td>364,00</td>
<td>1.046,10</td>
<td>16.653,00</td>
<td>16.985,00</td>
<td>58.355,00</td>
<td>1,18</td>
<td>0,0190</td>
<td>1,83</td>
</tr>
<tr>
<td>2001</td>
<td>703,10</td>
<td>957,10</td>
<td>22.694,40</td>
<td>22.885,00</td>
<td>76.645,00</td>
<td>1,44</td>
<td>0,1310</td>
<td>1,87</td>
</tr>
<tr>
<td>2002</td>
<td>682,00</td>
<td>1.215,70</td>
<td>28.750,00</td>
<td>23.343,00</td>
<td>96.833,00</td>
<td>1,58</td>
<td>0,0820</td>
<td>1,92</td>
</tr>
<tr>
<td>2003</td>
<td>1.043,90</td>
<td>1.648,10</td>
<td>30.444,00</td>
<td>23.352,51</td>
<td>113.811,00</td>
<td>1,79</td>
<td>0,0780</td>
<td>1,98</td>
</tr>
<tr>
<td>2004</td>
<td>1.503,90</td>
<td>18.497,00</td>
<td>32.728,00</td>
<td>18.603,52</td>
<td>137.425,00</td>
<td>1,96</td>
<td>0,0720</td>
<td>2,05</td>
</tr>
<tr>
<td>2005</td>
<td>1.745,30</td>
<td>2.242,30</td>
<td>35.808,00</td>
<td>23.675,00</td>
<td>159.912,00</td>
<td>2,23</td>
<td>0,0650</td>
<td>2,13</td>
</tr>
</tbody>
</table>

Source: Annual Report of Banco de Moçambique, Secondary Data, 2010-2012

The data was collected from annual value basis and all the variables where not available in a quarterly basis just on annual data. In order to convert this data from annually to
quarterly, interpolation method was used to increase the number of observations and to clarify the effect of the change in the exchange rate (see appendix A), (Lisman and Sandee, 1967).

The data set considered in the estimation for the period 1991:1 to 2004:4, giving the total of 56 observations, the data was processed using EVIEW 3.1 software, which is the common package used in the econometric world.

In order to allow the research procedure, all the variables were converted to natural logarithms (LN), except Technology and productivity which were collected in percentage changes and all variables were seasonally adjusted, except the technology and productivity which were collected in real value.

The variables which were used to determine the equilibrium RER were the following:

- \( \text{LNRER} \), the natural logarithm of the Real Exchange Rate, which is the dependent variable, measures the nominal exchange rate giving the price of the United States dollar in domestic currency unit, multiplied by the CPI of the United States divided by the CPI of Mozambique used and the data was collected on the annual basis from BM quarterly statistical bulletins and then interpolated using (Lisman and Sandee, 1967) interpolation method.

\[
\text{LNRER} = \text{NER}_\text{USD} \times \frac{\text{CPI}_\text{USD}}{\text{CPI}_\text{MOZ}}
\]

[Equation 39]

Where:
\( NER_{USD} \) \textit{Nominal Exchange Rate from United States of America},

\( CPI_{USD} \) \textit{Consumer Price Index from United States of America and}

\( CPI_{MOZ} \) \textit{Consumer Price Index from Mozambique.}

- \textit{LNTOT}, the natural logarithm of Terms of Trade, explanatory variable defined as the ratio of the world price of Mozambican exports to the world price of imports and is used to represent changes in international economic environment. The variable was collected from annual reports from the BM quarterly statistical bulletins and interpolated for quarterly data, (Lisman and Sandee, 1967).

\[
LNTOT = \frac{P_x^*}{P_m^*}
\]

\textit{Equation 40}

Where:

\( P_x^* \) \textit{Foreign prices of exports and}

\( P_m^* \) \textit{Foreign prices of imports.}

- \textit{LNGC}, the natural logarithm of Government Consumption and GDP, used as proxy for the composition of the government expenditure, it\'s an independent variable and measures the degree of government expenditures which affect the RER. Edward (1994) also employs this variable to computing the ratio of government consumption on non tradable to GDP, which is correct variable to use in the model. The LNGC data was collected on annual basis from BM quarterly statistical bulletins and interpolated using (Lisman and Sandee, 1967)
\[
LNGC = \frac{GE}{GDP}
\]  
\[Equation. 41\]

Where:

- \(GE\)  
  *Government Expenditure.*

- \(LNFDI\), natural logarithm of Foreign Direct Investment, is independent variable and is a ratio of FDI and GDP, measures the capacity of foreign currency to influence the RER. The data was collected from annual report of IMF, interpolated using (Lisman and Sandee, 1967) method.

\[
LNFDI = \frac{FDI}{GDP}
\]  
\[Equation. 42\]

Where:

- \(FDI\)  
  *Foreign Direct Investment and*  

- \(GDP\)  
  *Gross Domestic Product.*

- \(LNRES\), the natural logarithm of a ratio of Reserves and GDP. The data was collected on annual basis from IMF report (2000), interpolated using (Lisman and Sandee, 1967) method.

\[
LNFDI = \frac{RES}{GDP}
\]  
\[Equation. 43\]
Where:

\( RES \) \( \text{National Reserves.} \)

- LNTR, the natural logarithm of a ratio the sum of export and imports to GDP, current prices and is an independent variable, the variable was collected from an annual report of BM's quarterly statistical bulletins and then interpolated using (Lisman and Sandee, 1967) method.

\[
LNTR = \frac{X + M}{GDP} \quad \text{[Equation. 44]}
\]

Where:

\( X \) \( \text{Import Goods and Services and} \)

\( M \) \( \text{Export Goods and Services.} \)

7. TP, Technological and Productivity, measure the changes captured by total factor productivity from the Solow residual, is independent variable, easily collected from the change in the real GDP, the variable was collected based on the annual sources of BM statistical bulletins and interpolated using (Lisman and Sandee, 1967) method.

3.10. **Empirical Model**

After the assessment have presented clear and also the variables to be included in the analysis, it becomes important to specify the empirical model to be evaluated. Its frequently single model would be expected for the equilibrium real exchange rate. Following the various empirical studies related to the equilibrium real exchange rate,
which indicates that the RER is determined by both the real and nominal variables in the short run. These variables included in the model are $TOT$, $TR$, $FDI RES$, $GC$, and $TP$. Concerning the long run relationship, the following model was used based on the empirical studies conducted by Sexana and Atasoy (2005), Choudhri and Khan (2004), Dhiwayo (2002), and Elbadawi, Aron and Kahn (1997).

$$\text{LnRER} = b_0 + b_1 \text{LnGC} + b_2 \text{LnTOT} + b_3 \text{LnTR} + b_4 \text{LnFDI} + b_5 \text{LnRES} + b_6 \text{LnTP} + \mu_i$$

[Equation 45]

The impact of each of these variables on the RER has been covered in detail in chapter 2, but here the study presents a summary in order to define the model specification. Since it is obvious that the specification model, is relatively different from the model derived by some researchers mentioned above.

The relationships are in the same aspects, for example, Government Consumption, assessed by the (GC) as the dependent variable used by all empirical studies presented above because it is proved to perform or manage the government budget, however it is the one side represented government expenditure, a change in GC depends on its composition between tradable and non tradable goods, expected signal GC coefficient ($b_1$ in equation above) is positive.

Terms of Trade represented by the (TOT), this explanatory variable was used by all the authors who presented above; TOT measures the degree of international competitiveness because Mozambique has trade partners and import and export goods and services. The impact of TOT on the RER is theoretically ambiguous, it depends on
the strengths of the income and substitution effect, therefore, can be negative or positive for a coefficient ($b_2$).

Trade Restriction measure by (TR), is considered a good explanatory variable to measure the degree to openness, this variable was applied by all the researchers who presented above. An increase in TR through trade liberalisation, increases imports and worsens the current account balance of payments, thus causing the RER to appreciate, a negative sign is, therefore, expected for the coefficient ($b_3$) of TR.

Foreign Direct Investment (FDI), is also a good dependent variable to measure the capacity of the economy to operate with foreign currency, this was also applied by Dhillowayo (2002) because he considered the characteristics of the country as developing country such as Mozambique. An increase in FDI, leads to the appreciation of RER, the coefficient is expected to be positive ($b_4$).

Reserves measured by RES, dependent variable used by Sexana and Atasoy (2005), measure the performance of national economy in managing and consuming other currency, inflow of reserves leads the RER appreciation and the expected positive sign of coefficient ($b_5$). Technology and Productivity considered by TR and is dependent variable used by all the authors who presented above, a rise in relative TR is usual associated with the stronger productivity, the priority sign is positive sign of the coefficient ($b_3$).
Synthesized form, the operability of a regression model, is based on the adoption of a theory that supports such a development in the specific case of this study, the RER model, the fundamental problem of this model because, according to research presented at the chapter two, can contribute to the unavailability of time series data for some RER potential determinants. Although theoretical studies support the presence of a few theoretical and empirical determinants of RER in the estimation model with time series data, especially as GC, FDI and RES have time series data that more clearly and coherently influence in determining the rate Rates.

The other determinants of the equilibrium exchange rate are going down the equation or otherwise, proxies for them are to be found, both approaches as research makes follow-up. The estimated RER equation under the time series data and proxies for these specific cases that have no data. The next chapter, therefore, describes and presents the results.

3.11. Triangulation, Validity and Reliability Issues

A technique of triangulation is applied, and approaches based on the confirmation of the validity increases by incorporating various possible viewpoints and methods purpose of improving approaches to the study. In matters of social sciences, it refers to the mixture of two or more data collection sources, approaches, techniques and styles or researchers in a study of a single phenomenon or isolated events to gather in a single building, and are clearly applicable in all studies without mentioning its nature because it allows better coverage of results or be used in both quantitative (validation) and qualitative (survey) studies.
In the analysis of ideas about how to combine methods and techniques of social studies context, back to debates about the use of the technique of field work or even direct contact (interviews) and participant observation sessions. Currently, the analysis of opinions on the relationship between quantitative and qualitative methods or approach, as seen by Blaikie, particularly in evaluation research, have advocated a combination of methods enables greater integrity of these variables because of a viewpoint may be qualitative or quantitative point of another, so this combination of research based on the nature as stated the study of Blaikie, (Blaikie 1991).

In the context of this the research, the triangulation applied in term of types of data used in the study, primary data and second data, the study applied this process because there are issues that one types of variable cannot explain the model, there need other types of data to fill the gap.

In the context of theoretical literature, the study applied combinations between groups of models to explain the real exchange rate determination, the triangulation process was done in the associations of PPP approach, Balassa-Samuelson and Eduard and Montiel approach.

The most variables used in the study, there pass true the triangulation mechanism, because in the process of data collection, the study applied combinations with variables to get a specific procedure to get a data and be simply.

In the context of data analyze and interpretations, the study used the associations method, graphical representations and model expressed in the regression model, this
was done to emphasize the result and get more realistic and consistent, because both method of present data are complemented.

3.12. Ethical Issues

The researcher requested for permission from central bank of Mozambique, which is the institution responsible for the macroeconomics policies and the model used in this particular study are also macroeconomics approach by the nature of the variables, in term of the data used in this study, in addition, the models and the package applied in this study are frequently used by the policy-maker in Mozambique. The critical variables and the annually reports used in this study are credible and recognized by the government of Mozambique and IMF.

3.13. Data Analysis and Interpretation

The main process of the data analyzes and interpretations of this study were a Correlation used to assess the relationship of the dependent variable exchange rate and among all group of independent variables of the study.

The software used to process a data was *EVIEW 3.1*, and the method applied in model was ordinary least square for estimate the long run relationships among the variables and *EXCEL-WIDNOW 8.0*. are used to brings a graphics with a favorable presentations and easy to understand. Correlation models have many important financial applications.

The coherent and consistent expectations of associations between the different variables associated with estimated exchange rate, in turn, their levels of variability are necessary
factors and determinants to measure levels of influence expected levels of coverage in the exchange rate.

The correlation levels are quite binding in models with varying risk and expected first introduced by Markowitz and now widely applied and used in financial markets. As a reference to the above, consider the Capital Asset Pricing Model and Arbitrage Pricing Theory using correlation as a tool of dependence between deferent assets in order to predict the behavior of an ideal portfolio estimates. However, the measure of welfare or estimation and prediction correlation is not always simple. It is reflected complication given by a number of factors, (Markowitz, 1952).

First, the correlation between the conditioned media assets is not directly observable: quarterly correlation, according to the data structure used in this study, currently, was not observable, because there was only one observation in successive periods of trading. The usual techniques showed that the conventional approach was to estimate the correlation matrix with data performed on the returns of assets (Andersen and Bollerslev, 1998). More recent practice employ higher frequency data to estimate correlations performed (Andersen et al. 2001).

Second aspect, long ago correlations in finance were assumed to be immutable and as such were regular. But during the last 20 years, studies have shown that levels of the variables are furthermore they generally increased during periods of high market volatility and the time variable.
Thirdly, as a marked increase in the level of active, such that affect the estimation of the correlation matrix becomes increasingly difficult to cause the scope making up so that measures an obstacle to high levels of volatility. Given these embarrassments, modeling correlations have spreads in various areas and fields of competitor’s research, all based on research in financial volatility index undertaken by (Engle, 1982) and (Bollerslev, 1986).

Effective approaches or options include stochastic volatility models, models for sensitivity estimates of implicit indicators (with and collected based on options prices information), and models that can accommodate autoregressive conditional heteroscedasticity generalized (GARCH effects). Long ago the approach of GARCH multivariate models have been applied and quantitative studies improved in areas, which allow correlations vary in time. In these methods, the tendency of the conditional variances are modeled as univariate GARCH models, that is changes and variations of a variable or last categories are only prevented from associating or affect the conditional variances of the other study variables, (Engle, 2002) and (Lien et al, 2002).

This is a limitation. But in their favour, these models cope well with the case of dimensionality and can be augmented to accommodate a variety of empirical dynamic phenomena. In this study a model of dynamic conditional correlations is used to examine gold-price returns and exchange-rate returns.
3.14. Chapter Summary

This chapter provides a set of information that illustrates the key features of the process and techniques provided within this search. Nature of the data and techniques applied to this style of study fit well to the quantitative research. The target group of this research study was characterized by the following strata: Central Bank of Mozambique, Financial Institutions, Economic Agents, Ministry of Finance and Mega Projects.

The empirical methodology followed the following procedures: analysis of stationarity, the relationship long term and short term and finally confirmation of the model test. The process of data collection was characterized by primary and secondary data.

The primary data was conducted by three members of each stratum mentioned above by means of a survey, while secondary data study has collected data from the Following, Export (X), Import (M), GDP, Government Expenditure, FDI, RER, Real GDP, Nominal Exchange Rate Mozambique, United States of America Nominal Exchange Rate and Mozambique national reserves, this data was collected from Central bank of Mozambique statistical bulletins, reports and IMF data were collected different from reports of the Central Bank of Mozambique, the institution responsible for policy exchange.

The research at the end brought out triangulation, validation and reliability of the study by looking at associations between the level of theories and techniques applied in the study. Ethically, respondent’s ideas captured by the data capturing instruments would be treated confidentially, accountably enough, never to be divulged.
CHAPTER 4: RESEARCH FINDINGS AND INTERPRETATION

4.1. Introduction

The presentation was made in the previous chapter references the content of methodologies and techniques, focusing basically a survey and caution in the procedures to be applied in order to provide consistent results. The objective of this chapter focuses on the process of presenting and interpreting data. Thus this data have two categories, the mention; the first and second graphical illustrations demonstrating the estimates based on regression models the long and short term and their respective statistical inferences that justify their consistencies.

There is evidence that the RER is appreciated and otherwise depreciated. In search of the answers to the hypotheses, it begins with the test for stationarity, using observation method or visual plot and ADF unit root test for all variables that were used in the model of ERER. Subsequent to the Engle and Granger (1987) cointegration test was used to analyze the long run relationship between the variables, next step the ECM to examine the short run relationship and finally test the support of the model.

4.2. Testing for Stationary

The stationarity tests are helpful in the logic that they help avoid spurious regression. Two stationarity tests were undertaken, one for formal and the other for informal test, visual plot and ADF unit root test.
The initiative behind the stationarity test was to discover the integration order of the variables to proceed with the cointegration test. For stationarity tests, all variables were included, that is fundamental variables applied in the model specification. The preliminary analysis of data was important as it allows the recognition of any data capturing errors, and structural breaks and gives an idea of the trends and stationarity of the data set. Figure 2 plots the seven variables of the RER model of this study against time.

4.2.1. Visual Plot

The informal test on the structural trend of the time series was used as a mechanism to meet the objective impression of the tendencies of the variables. Test for the stationarity of the variables, the first impression of the possible trends of means and variances among the variables. Figure 4.1 illustrates the trends in the series that will associate to the model analysis of the implications of exchange rate policy in the performance of Mozambique's economy. As one can see, the RER and TP seem seating trending up and another IDE and TR, Fall Trend, albeit with fluctuations. The remaining three variables as TOT, RES and GC are presented and show no trend, but also show enormous variation over time.
Figure 4.1: Stationarity Test Using Visual Plot

Source: Annual Report Central Bank of Mozambique, 2013
The sequential evolution of combining coins USD and MZM were measured on a measure of general scope known as exchange rate USD/MZM and the real exchange rate, the price level is adjusted NER USD and the rate MZM Exchange for the period (1995 to 2010). The real exchange rate of USD/MZM in this case was the degree adjusted for variations in levels of relative prices between the two countries using CPI measures applicable universal consensus. It is evident from the figure that for most of the period, the exchange rate of USD/MZM depreciated par with low levels of deviations from this trend beginning in mid-2000, due to the continuous economic reforms which have hitherto applied.

The sharp depression that the Mozambican economy has suffered, that was due to its negative trade balance has transmitted an effect on the levels of depreciation in the years (1995-2003), when there was an accelerated depreciation of over 62 percent, the most ever seen in Mozambique after the general peace agreements, so these depreciation levels associated to the level of performance of the national economy.

From this period, levels of appreciation of the domestic currency, gained another dynamic economy and started recording light stabilities and was in this period that the economic sustainability concept becomes country and lower depreciation levels by (2009-2010), when there was depreciation significant 29 percent. An excess volume of the nominal depreciation was reversed in the first eight months of 2011, as MZM begins to become robust and enjoying considerably more than 23 percent against the USA dollar.
Based on the results presented in Figure 4.2, it should be noted that large fluctuations between bilateral nominal and real exchange rates was due to the accelerated levels of inflation that the national economy and its partners have lived trade relationships.

Levels of inflation has been much higher and volatile in Mozambique compared with its largest partner of the U.S.A since 2000, so the exchange rate USD/MZM is positioned above the structured bilateral nominal rate for all periods up to 2015. In most case the adjusted inflation rates depreciated from (1995 to 2000). Thereafter, there was a significant real appreciation of 30 per hundred of (2000-2011), which was due to the return to social readjustment after the 2000 floods that devastated the national economy.

Most levels of appreciation of the national economy during the period (2000-2008), when the rate of USD/MZM real bilateral jumped 20 percent, several developments explain this period of change in the trend of the economy, large and high volumes entry of foreign investments, increase in public spending and improving the revenue collection of the government system.

There was the nominal bilateral rate for downloaded and consequently there was a significant real depreciation in (2009-2010), a period that was characterized by social upheaval and thereafter, the 28.9 percent real appreciation that occurred changed this propensity to low in January to August 2011. When thought that everything was on the basis of expectations about the domestic currency to appreciate relative to the USD in real terms since 2004 and today is about 30 percentage points above its 2012 level.
Given the current situation in Mozambique, the country through has lived importing large volumes of neighboring South Africa. This has led to focus and analyze the effects of Rand on the national economy. The bilateral nominal exchange rate of Rand/MZM in Figure 4.3 illustrates that the national currency in the period from (1995 to 2011) against the Rand depreciated by 31 per hundred, the occurrence of this precarious economy has been growing due to strong exports and inflation that transported much of this nominal depreciation occurred in (2001-2010), when the Rand/MZM rate depreciated by almost 50 percent. This trend reversed dramatically in mid-2008.
On the levels of inflation-adjusted real terms, there was a significant depreciation of the national currency on average 66 percent of medical against Rand (1995-2002). In the following years, there had been significant changes - a moderate depreciation of 23 percent in 2003, an increase of 33 percent from (2005 to 2008), a reversal of this phenomenon was measured in value by 31 per cent in (2009-2010) and finally a recovery of 31 percent again until August 2012.
The convergences of the bilateral nominal rate EURO/MZM in the exchange process, clearly depicted in Figure 4.3, indicate a persistent volume depreciation of the national currency against the euro over the period 1995 up to 2012 study period but current trends show that the euro continues its robustness face to MZM. Between the years (2000-2010), the nominal rate EURO/MZM depreciated by 63 percent. Most of this depreciation was held in does not solidification of the economy between the periods (2000 to 2007). Since then, the nominal rate EURO/MZM depreciated on average only 3 percent additional.
The rate EURO/MZM set the actual inflation levels bilateral MZM also indicates a continuous excess depreciation mostly in periods of severe crisis, however the depreciation rate has been much less steep due to differential rates of inflation in the euro area and Africa and Mozambique in particular that are unstable and influencing the exchange rate.

Depreciation of the real against the euro MZM since 2000 has averaged 18 percent per year. There was some significant variability during periods of periods with duration of more than 10 years and with a large elevated levels of depreciation reaching 36 per hundred in the (2000-2003), a long period of currency appreciation of normal real after about 25 cent and then a supportive and significant appreciation in 2011 around 23 percent.
Bilateral biased fluctuations in exchange rates can be misleading references in the measurement of global and necessary for determining the MZM values, so in Figure 4.4, presents an effective demonstration and real effective exchange rates for the years between (1995-2011), calculated using quite a few methods applied globally and IMF.

The index of the nominal effective exchange rate is the interpretation average of bilateral nominal exchange rates between Mozambique and each of its trading partners, weighted by the respective periods and trade shares of each partner and therefore represents comprehensive and very useful measure broader movements in currencies for analysis or comparison such as MZM on global markets. In recent years, the critical and
commercial partners of Mozambique have expanded since the ancient times and with a historical reference were: European Union (EU), South Africa and the USA, to include China and India currently.

Trade volumes with EURO and South Africa continued - EURO (55.7 percent) and South Africa (36.3 percent), while China (3.2 percent), India (2.6 percent) and the U.S. (2.2 percent) are the portion that fills the universe of the remaining total. The effective exchange rate index of the effective exchange rate nominal rate adjusts to different levels of inflation in trading partner countries, using measures of reference and relevant CPI.

As in the real effective exchange rate is a ratio between relative price levels, measuring pulses prices in Mozambique related to its trading partners, is generally used as a measure or indicator of the degree of competitiveness. The nominal effective rate presented in Figure 4.4 shows the effects of the significant depreciation against all its trading partners throughout the reference period of more than 50 percent.

In 2002, the nominal MZM depreciated by 40 percent. Moreover, the nominal effective rate that experienced substantial variability in the period and a reduction of 45 percent between the periods (2000-2007) and faster appreciation starts in mid-(2007 to 2008), with about 23 percent and variability has to occur between (2008-2009) with 28 percent for the benefit of national currency and finally, an appreciation of 23 percent again in (2010-2011). This has demonstrated the unstable characteristic indicator of competitiveness, which illustrated that the national economy has been quite volatile.
The benchmark of the real effective rate exhibited volatility levels controlled in particular since 2000. Focusing on the recent decade, it can be observed that after a significant real depreciation of 30 per hundred against their commercial partners highlighted in (2000-2003), the MZM tend to lose competitiveness to the rest of the decade, the depreciation of almost 50 percent in 2011, with the exception of one point depreciation of 15 percent in 2010.

A good part of this decline in competitiveness seems to be due to much higher levels inflation rates in Mozambique, compared with its major trading partners of cooperation. However, since the decade as a whole, the real effective exchange rate, despite significant dispersion, and closed the season only slightly appreciated (6.4 percent) above where started in 2000.
The feature of exchange rate and striking fluctuations of the national currency, the review highlights the persistence of the volatility of the exchange rate in (1995-2010). Figure 4.6.1 shows the behavior of the indicator of the volatility of the real exchange rate, Mozambique, applied the measure most commonly used to calculate the volatility of the exchange rate - the statistical standard of the first order difference of the logarithms of the exchange rate error (Clark, Tamira, and Wei, 2004).

There was evidence that the exchange rates could enjoy an inevitable feature of uncontrolled and flexible in both internal and external factors, the extent to which they become a source of uncertainty and risk which is a function of association's fluctuations.
that is expected. When people can protect this part of the predicted volatility can be removed and, therefore, may not have much effect on economic decisions.

The pattern of the first order difference of logarithms as we use highlighting deviation has the characteristic that it will be zero if the exchange rate follows a fixed or constant trend, which presumably could be expected and therefore would not be a source of uncertainty and risk. We calculate the variation in the exchange rate over a month, using data from the end of the month.

The measure of volatility commonly recognized in error or standard deviation is then averaged over a period of one year as an indicator of short term volatility, which is represented in Figure 4.6. The average volatility over a period of three years, to capture the long-term volatility. All estimates of volatility are consistencies for the real effective exchange rate for the period (2000-2010).

The estimates in Table 1 and Figure 4.6 indicate that the average volatility of the real exchange rate is excellent in Mozambique. The average standard deviation of long-term for the entire period is 3.9 percent. Moreover, the volatility seems to have increased and will lower its power over the decade - an increase of 40 percent, from an average volatility of 2.6 percent in the first half of the decade to 3.7 in the second half. To put these estimates in trend, we can compare the performance of Mozambique competitiveness with real measures of volatility of exchange rates for 150 countries for the period (1970-2002), calculated using the same approach as in this study (Clark, Tamira, and Wei, 2004).
The real exchange rate of Mozambique has high average levels of volatility compared to developed countries, where the volatility on average between 2 and 2.5 for the years (1970-2002). The volatility of the exchange rate is lower than average, one can consider an economy with moderate stability, expected in developed countries, as they have higher levels of economic stability and very smooth and uncertainties or adjustments to shocks, given the diversity of their economies.

Additionally, the foreign exchange markets where currencies of precedence countries trade relations are large and liquid, with many instruments and mechanisms available to predict the level of volatility, these markets would help to clean quickly and to reduce potential and large fluctuations in rates.

Analyzing the levels of volatility in the exchange rate of the national economy and other developing countries, Mozambique has more positive and favorable aspects to its economy, although it is still a little on the high side. Developing countries as a group tend to form estimated average twice the average volatility of the advanced countries. However, the channel bottom group of countries (volatilities) weight of the developing countries generally showed higher average volatility of less than 3.0 percent, while the upper end of average about 5.0 percent.

Divide the group of developing countries a little advanced, Mozambique tends to fit so naturally with the group of developing countries that are classified as major non-fuel exporters, which illustrated the huge and high levels of volatility in the exchange rate average real in the universe. In this group of developing countries, Mozambique is the volatility of the average exchange rate in the medium occupies about comparing
countries that are part of the group. Mozambique is the volatility of the exchange rate with trends which is normal but for an exporting country of noncombustible, for primary exporting country which is subject to the constant effects of shocks in terms of trade and relationship with overseas due to honored volatility in global commodity markets.
Fluctuations in the real effective exchange rate index that have been demonstrated tells us something about the dynamics of competitiveness more distinguishable on the basis of periods of time and on volatility, but they do not illustrate a point of reference to analyze the adjustment of the exchange rate in terms its real value or purchasing power.

Money is valuable because it purchases goods. Therefore, the correct-exchange rate (or reference point for the assessment of value) between two national currencies must be the one that equalizes their purchasing power. The hypothetical exchange rate should equalize domestic prices and foreigners of a basket of tradable goods and services. Any movement in the real exchange rate away from this - buying exchange rate parity of
power can be considered an exchange rate misalignment.

Analyzing the context of all the deviations of the actual real exchange purchasing power parity indicates inevitably basic misalignment. To better understand an important example is due to innovation in the tradable goods sectors in advanced countries, known as the Balassa-Samuelson effect, which causes the real exchange rate in advanced countries enjoy compared to the less developed countries. Performance improvement in rich countries leads to higher productivity, which somewhat reduces the levels of costs and prices of tradable goods and thus leads wage levels.

The approach of lower prices for tradable goods is transferred to other countries through open marketing. As there is less competition and innovation on non tradable goods and services across the globe, the prices of tradable goods will tend to decrease over time relative to non tradables.

The researcher may think that rising wages in tradable goods, due to improvements in productivity and production was pushes up wages in non tradable sectors as companies operating in the same sector for workers. Rich countries with high productivity growth rates, high output will have a great weight of non tradable goods and services (eg, housing) consumption will thus have high average CPI compared to the poorest countries. In summary, the countries get richer, the levels relative prices of non-traded goods tend to increase due to increased productivity and production in tradable. This effect increases in price levels tend to appreciate the real effective exchange rate, as income increases.
To analyze the level of the real exchange rate of Mozambique misaligned and how we design an index volatility forecast depreciation of the real exchange rate based on the postulates of PPP measures of price level in the Penn World, following Rodrik (2008). The index is primarily a real exchange rate parity of purchasing power adjusted for the Balassa-Samuelson effect. The relative price of tradables to non tradable goods in the economy, adjusting for the effect of income on the relative prices of non-traded goods.

The compilation of the mathematical basis of understatement was built, when the index record levels of depreciation is greater than one indicates that the value of the currency is lower (more worn) than is indicated by obtaining power parity and is therefore depreciation when the index is compared to currency is less than one when the coin is overestimated. The shows the average of 3 years for the exchange rate and the rate of devaluation, and shows the percentage change of currency for each period (a negative sign indicates overvaluation.

Based on the survey results, Figure 4.7 makes a reference about the degree of overvaluation is decreasing. The last column of Table 4.1 shows that the degree of overvaluation with incidence of continuously falling from a peak of 36 percent in the years 1997 to 2000 to only 3 in (2009-2010).

In periods like 2007, the real exchange rate of Mozambique had achieved a goal of parity of purchasing power with the USD as the rate of depreciation equaled one that year. Since then, MZM if you were in a range of about 10 per cent overvalued to near normal state of balance in 2010.6 So far in 2011, the MZM is moving backwards towards overvaluation again - increasing the length of level of over valuation by about
11 percent, if we are to calculating index of undervaluation using the expected exchange rate of the period of eight months to August 2011.

An alternative mechanism for the stability of the exchange rate, if we were to use the exchange rate as of the end of 2011 to predict or calculate the rate of devaluation, the extent of overvaluation would be 39 percent, second the data presented in Table 4.1. Considering the amount of volatility in the exchange rate, exhibited in table 1, however, there is little reason to believe that this great increase in overvaluation is a continuous trend.

**Figure 4. 7: Purchasing Power Parity and Depreciation, 2000-2010**

*Source: Author, 2013*
Table 4.1: Depreciation of MZM, 2000-2010

<table>
<thead>
<tr>
<th>Periods</th>
<th>NER Average USD/MZM</th>
<th>PPP Average</th>
<th>Depreciation Index</th>
<th>Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2003</td>
<td>22.72</td>
<td>94.56</td>
<td>0.65</td>
<td>-0.15</td>
</tr>
<tr>
<td>2004-2006</td>
<td>23.83</td>
<td>128.32</td>
<td>0.81</td>
<td>-0.09</td>
</tr>
<tr>
<td>2007-2008</td>
<td>26.95</td>
<td>122.13</td>
<td>0.92</td>
<td>-0.08</td>
</tr>
<tr>
<td>2009-2010</td>
<td>31.21</td>
<td>121.56</td>
<td>0.95</td>
<td>-0.05</td>
</tr>
</tbody>
</table>

Source: IMF, 2011

Attendance levels of volatility in exchange rates that MZM has occurred in recent times, mainly between 2000-2010, the effect of a negative sign in column undervaluation indicates overvaluation. Based on the theorems of PPP, the real exchange rate is calculated using data provided by the IMF until 2011 and data for CPI and exchange rates are obtained from various national sources as the central bank of Mozambique. Trade weights (fixed) are obtained from the Central Bank of Mozambique, 2011, may have consequences the effects of sensitivity and instability of the economy and the main transmission channels through which these exchange rate shocks influence economic outcomes in the sustainability of estimates of some of the major impacts.

The main transmission channel based on fluctuations in the exchange rate affect the economy objectively is through its influence on the price level (inflation). The fundamental effect of the impact of import prices, which through the price chain,
triggers changes in consumer prices and production costs. These direct effects of prices on the economy, are generated channels that in turn generate indirect impacts and second order through changes in real income, consumer spending, and trade flows, which added consequences for the direction overall changes in the CPI. The other direct effect of exchange rate on prices is through the impact on export prices, which leads to changes in profit margins of exporters and trade volumes.

The ERPT dynamics worldwide illustrates current trends of exchange rate changes is not perfect. In developed countries, the ERPT to import prices average around 60-70 percent. Import prices are the first link in the prices directly affected by exchange rate changes chain. Further down the price chain, the ERPT to final consumer prices is continuously lower in developed countries, averaging only 13 to 30 percent (Campa and Goldberg, 2006).

The various factors that cause the exchange rate changes are: There is the effect of the behavior of trading partners for import prices on domestic prices, which can decrease the elasticity transported by a higher price behavior of the market (absorbing over variations in exchange rates on its banks). Asian exporters carry it to increase the flow of trade given the crisis in 1990.

The pass-through effects associated with the behavior of the threshold effects. There may be limits to arbitrage and monitoring the behavior of agents in the market, where price levels converge only if the differences in price levels are above a certain threshold that makes profitable arbitrage. More primes the transfer would be clear once the thresholds of inaction n are taken into consideration.
The prices of imports made against exchange rate variations may be greater than in reaction to consumer prices, because (a) there are no tradable CPI, (b) the costs of distribution channels reduce the value imports of foreign content, and (c) imperfect competition in the provision of the channel which allows distributors to balance their profit margins to the exchange rate, in order to expand the capacity of the market.

A consistent estimate of ERPT to domestic prices in Mozambique. Using the database customs authority for 2000-2005, this study examines the effects of price transmission of 25 products associated and important in three major cities of Mozambique Maputo, Beira and Nampula, (Cirera and Nhate, 2006).

Consumer prices for an imported product should be equal to the price on free border (FOB) adjusted to include insurance and freight (CIF) plus fees and taxes, border as the Value Added Tax (VAT), plus transportation costs and a profit margin.

Mozambique is a small country with a capacity to influence the behavior of market prices of foreign exporters. Figure 4.7 shows the progress of the price index for imports from Mozambique which was associated with nominal exchange rates over the past 12 years.

There was a tight correlation based on estimates with the use of regression, which indicated an estimate of pass-through to import price elasticity of 71 percent. The purpose of transmission of exchange rate changes to consumer prices is also very high in Mozambique. There is evidence that the passage of ERPT to consumer prices is more than 75 percent. Therefore, a consumer price appears to be highly sensitive to
fluctuations in the exchange rate.

A research was carried out using an approach to equilibrium of long and short term (cointegration and error correction model) associated with a small sample of monthly data from (2001 to 2006) in Mozambique. It found a much smaller effect on transmission. The research conclusion was that the depreciation of the exchange rate of 1 percent leads to an increase of 15 in the price level. There was evidence that changes in the prices of South African and money supply are more important than exchange rates to explain variations in domestic prices, (Vicente, 2007).

These results demonstrated in their study can in part be due to the use of a small sampling and modeling strategy. Another was done which describes elasticity with effects on the exchange rate to domestic prices in Mozambique that is according to the presentations of the results and Cirera Nhate. The result from this study showed that the entry of imports is the share of the total domestic demand, (Omar, 2003).

The transmission of high prices is symmetric and currency appreciations and depreciations are transmitted formally equal to consumer prices compared with the ERPT elasticity for appreciations and depreciations by indicating only a marginal variation with elasticity to gently testimonials being 1.05 times higher in the elasticity of depreciation.

The fact that there is extensive transfer or transmission channels for the exchange variation of prices in Mozambique shows that companies in the prices for these imports channel have usually a fixed mark-up the price of cost. Why do companies in countries
with greatest degree of progress behave so differently in Mozambique, resulting in lower one ERPT to consumer prices in advanced countries? The answer is that the market model system in Mozambique is very different from that of most developed countries. The entry of imports in the Mozambican economy is very high in these countries and opened while the system penetration is slightly closed.

Imports play a large role in the economy as measured through GDP - on average, in some years, more than 30 percent of domestic products with associated value, and imports symbolize a share of about 25 per cent of domestic demand. For a group of products, entry import is much greater than the input at the factory, for example, reaches nearly 60 percent of domestic demand. This increases the power of the ability of foreign companies price (since there is no incentive to defend these market shares abroad through active behavior pricing-to -market) bringing the ERPT to import prices.

Domestic market in Mozambique is dominated by which products are not competitive. In most cases there is no, or very few, local goods which meet the surrogate effects and there are only a small number of large competitors in the service of companies and market price chain. The price mark - ups are informed consumers who generally have very inelastic demands for these basic products imported directly.

The ERPT to export prices in Mozambique is usually and should be smaller than the ERPT to import prices. A practical indicator is the correlation coefficient between exchange rate fluctuations and changes in the index of export prices. Figure 4.8 shows a graph of the relationship between the real effective exchange rate and index of export prices of Mozambique for the period 1995-2009.
The index of export prices on the real exchange rate and the estimated elasticity of export prices to changes in the real exchange rate. One is the correlation between prices and exchange rates during the period in the figure below. However, the statistical exercise find the elasticity to be relatively low at 0.32 - the estimate shows that the movements of the real effective exchange rate responds 16 percent of the variation in levels of export prices.

The effects of exchange rate shocks are transmitted through the export prices in Mozambique. Although there is a relatively low ERPT, the same practice lower the effects of transmission of export prices than import prices are generally true abroad, even in the most highly developed economies. And in the countries of Europe, for example, the average import price ERPT in becomes 70 percent, the ERPT to export prices is estimated at around 43 percent (ECB, 2008).
The fundamental reasons for the difference in the exchange rate and made transmission, center on the elements of the composition of exports, the external market competitive environments and exporter behavior and their market prices. The export of developed, for example, countries consists largely of manufactured goods where the price behavior of the market is more visible. Competitive markets increased tensions arising like China, Euro led exporters to change their mark-ups more and less export prices in response to exchange rate changes (ECB 2008).

In the specific case of Mozambique, exports are fixed in number and narrowly concentration (World Bank, CEM 2011). Only 14 products exports turnover of USD 1 million Exports of mega projects (aluminum, electricity, gas and titanium) are
responsible for over 79 percent of the export of 12 most wanted and making up the remaining 21 percent primary products. Overall, exports a low level of processing.

The few products that can get the conversion, such as wood, cotton, oilseeds and tobacco are exported at a very low stage of processing - for example, cotton is ginned in Mozambique and is ground to a certain extent, and receives cashew processing procedure. Although Mozambique is an exporter of commodities where the price behavior of the market is usually less false than in the industries, its export is expressed by several features that decreases the degree of exchange rate transmitted by export prices.

The 14 products record exports of more than USD1 million. Exports from so-called 'mega projects (aluminum, electricity, gas, and titanium) account for more than 79 percent of the export basket with 12 primary products making up the remaining 21 percent. Overall, exports also exhibit a low level of processing. The few products that might receive some further conversion, such as wood, cotton, oil seeds, and tobacco are exported at a very low stage of processing - for example, cotton is ginned in Mozambique, logs are milled to some degree, and cashews receive some processing.

While Mozambique is a commodity exporter, where pricing-to-market behavior is generally less apparent than in manufactures, its export basket exhibits several characteristics that reduce the degree of exchange rate pass-through to export prices. Prices are determined in world markets. For example, the majority of electricity exports involve long-term contracts that usually do not allow for large price fluctuations. In the cases of aluminum, coal, and minerals, export prices are also subject to long-term
contracts that typically take the form of a fixed market price with a negotiated standard escalation. Prices of all these commodities are expected to increase over time with developments in emerging markets, but in an orderly fashion, (Bucuane and Mulder, 2007).

For the remaining products in the export basket, the ERPT should be somewhat higher. However, relatively small Mozambican primary product exporters, with limited ability to hedge are sometimes compelled to engage in pricing-to-market behavior, according to interview respondents for this study. Mozambique’s export penetration in major markets is low and exporters face stiff competition and rigid contracts. Exporters also have a bit of leeway to behave strategically in some export destinations in the form of trade-preferences.

The EU, for example, offers unilateral tariff preferences to Mozambique’s exports, which provides some cushion in margins for strategic behavior. In their study of preferential tariff pass-through to Mozambique export prices in EU markets, provide evidence of exporter willingness to reduce margins to defend markets. When, for one reason or another, exporters cannot obtain proper documentation to enter the EU under available special tariff preferences, rather than renege on contracts, Note that exporters enter at higher tariff levels, absorbing losses in their margins, (Alfieri and Cirera, 2008).

Another transmission channel through exchange rates influence economic activity is via expenditure-switching effects on trade flows. Exchange rate appreciations, for example, make a country’s goods and services more expensive relative to foreign goods and services. This, in turn, leads to a shift in global demand away the country’s goods and
towards foreign goods. Consequently, the country’s exports decline and imports increase, and there is a resulting deterioration in the trade balance and a decline in the contribution of net trade to GDP growth.

A crucial element in this scenario, however, is the ERPT. The overall effect of an exchange rate change on trade flows is highly dependent on the magnitude of ERPT to import and export prices. It is only when a nominal change in exchange rates turns into a realized change in import and export prices in the buyer’s currency that a demand response will occur.

To the extent that Mozambique exporters engage in pricing-to-market behavior, reducing margins in response to an appreciation and maintaining export prices, or to the extent that mega-export contracts are of long duration with price escalation clauses, the export response to appreciation will be restrained. On the demand side, by contrast, it is clear that expenditure switching or demand responses in foreign markets to any price-related effects of exchange rates on Mozambique’s primary exports will be substantial. When the substitutability between products and suppliers is high (as in the case of most of Mozambique’s primary agricultural exports), changes in relative prices between products from different source countries generally result in a pronounced demand response to exchange rate swings.

In addition to price-related effects, other factors can be expected to have an important impact on the supply response of trade flows to exchange rate changes. These are the costs of entering a new market, which cannot be recouped in the event that an exporter must exit the market at a later date. Examples are initial marketing expenses and costs
of establishing a distribution network. These sunk costs introduce a degree of slowness in the responsiveness of trade flows. Without them exchange rate movements would not present a problem for incumbent, or newly entering, exporters, as they could react to changes with no loss in initial investment.

For example, in the presence of sunk investments. New entrants might choose to delay entry into export markets a bit longer to ensure that the exchange rate moves in their favor, as initial outlays could be squandered. In Mozambique, exporters complain that sunk trading costs are high. Local fixed costs of exporters, in the form of initial investments in acquiring land, dealing with the bureaucracy, getting infrastructure up and running, establishing local trade facilitation networks with transportation, ports, and customs, and so on, are considerable. And foreign fixed costs of establishing trading relationships and establishing distribution channels add to these totals.

According to exporters, these high sunk trading costs introduce a good deal of inertia into the export response to exchange rate changes. Another factor that may influence the exchange rate elasticity of aggregate trade flows is the import content of exports. When domestic value added is low, and imported inputs play a large role in export production, the impact, for example, of an appreciation on the foreign currency price of exports, is lessened, as the price of imported inputs falls.

The mitigating effect of imports may be important in shaping the export response in Mozambique, as the import content of some important exports is sizeable. Exporters note that most export companies are -green field investors, lacking the support of key suppliers in almost every area - capital equipment, intermediate inputs, packaging,
technical expertise, spare parts, and so on. All these critical inputs have to be imported.

A further potential mitigating factor for supply response revolves around hedging. To some extent Mozambique’s exporters can hedge exchange rate exposure and they can reduce the supply response to any adverse movements in exchange rates. However, as noted earlier, the ability to hedge in Mozambique is somewhat limited given the level of financial development. To hedge foreign exchange exposure exporters have the following narrow options available. For exporters that can afford the fees and other costs, large banks in Mozambique offer three hedging products: forward foreign exchange contracts (for imports and exports), funded forward foreign exchange contracts, and foreign exchange swaps.

The banks in Mozambique do not deal in foreign exchange options because of the cost (or premium) that would be charged to the client owing to the absence of an active interbank financial derivatives market. For smaller exporters that cannot, or will not, pay the costs of such products, the options available are to reduce foreign exchange exposure as much as possible, hold different types of foreign exchange in their accounts, or speculate in the local foreign exchange market through banks or exchange bureaus.

The business environment is an important factor in shaping the exchange rate-trade flow link. Mozambique’s rank in the World Bank’s Doing Business Report has improved in the last couple of years, but it continues to be positioned near the bottom of the list of countries with poor business climates. Its global competitiveness index, as measured by the World Economic Forum, also languishes around the lower rungs of the
competitiveness ladder compared with its peers. Financial constraints register as one of the worst elements in this lackluster business environment, and, according to the 2011 Doing Business Report, this feature of the business climate has actually deteriorated in the past few years, (World Bank, 2011).

Firms complain in surveys that both cost and availability of credit are problems. A number of studies on other developing countries have found that these business environment problems, particularly financial constraints, reduce the exchange rate elasticity of trade flows. Estimates of the exchange rate elasticity of trade flows have been carried out for a number of developed and developing countries at least since the 1950s. This work has been at the center of a long debate about how sensitive exports are to real exchange rate changes, (Colacelli, 2010).

Views have swung from - elasticity pessimism in the 1950s and 1960s, particularly for developing countries, to a more sanguine stance on the ability of changes in the real exchange rate to improve the trade balance (Ghe and Pritchett 1999; Reinhart 1994). Much of this debate has been driven by improvements in estimation techniques and in computing power through the years. A recent study found that an improves on the results by focusing on bilateral exchange rates, on a larger sample of countries, and on a wider number of sectors. The researcher examined the export response to real exchange rate fluctuations in a sample of 136 countries, during the 1980s and 1990s, for 440 sectors. Given this large and in depth sample, the investigation has the ability look at exchange rate elasticity in both developed and developing countries, as well as in separate product groups, (Colacelli, 2010).
The study finds that the elasticity of export response to real exchange rate changes of an average exporter in a developed country is 67 percent, while the elasticity in developing countries is 13 percent. These results are broadly consistent with other estimates of close to one for developed countries (for example, the average elasticity for EU countries is found to be 80 percent and well below one for developing countries. The researcher also founds that there are significant sectoral differences in the export response. Overall, exports of differentiated product sectors (such as manufactures) are found to respond more to real exchange rate swings than those of homogeneous products (such as commodities), (Colacelli, 2010).

This would explain some of the difference in the exchange rate response elasticity between developed and developing countries, as the export mix in developing countries is generally heavily concentrated in primary products. But the study also finds that the differences in response elasticity between product groups in developing countries are quite small; so export composition does not explain as much as one would expect. Colacelli’s conjecture, supported by research in other countries, is that this lower export response to exchange rate fluctuations in developing countries is due importantly to credit constraints.

Considering Mozambique’s low ERPT to export prices and obstacles in the business environment, one might expect the export response to exchange rate changes to be restrained. To examine this issue, the study presents a graph of the real effective exchange rate along with indexes of Mozambique’s aggregate exports by volume and by value for the years 1995-2009 in figure 9. One does not observe much of an association in the figure between exchange rate movements and the export indexes largely due to
the exponential rise in the export value index, which rose from 100 in 2000 to 728 in 2008 blowing out the y-axis of the graph.

4.3. ADF Unit Root Test

The formal test employed in this study is ADF, for stationarity, it is a very influential instrument used in evaluating the stationarity of time series. One relevant aspect that is 4 lags crucial although performing this test is related to the lag chosen, because normally, given a change in one macroeconomic variable another variable does not react immediately, instead it takes time varies from weeks, months or even years, and this time period is known as lag.

These tests were applied to the data under different deterministic trend assumptions, but those that include a constant and no trend produce less significant result, the option with no trend and no intercept produced explosive result, while the option with both a trend and intercept produced robust result, Table 2, therefore, shows the stationarity unit root test result for the option with trend and intercept (Gujarati, 2003).
<table>
<thead>
<tr>
<th>Variables</th>
<th>Level and 1&lt;sup&gt;st&lt;/sup&gt; Difference</th>
<th>Lagged Difference</th>
<th>ADF test Statistic</th>
<th>Critical Value (5 percent)</th>
<th>Stationary</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNRERSA</td>
<td>Level 4</td>
<td>-2.940705</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-4.356905</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>LNTOTSA</td>
<td>Level 4</td>
<td>-3.073833</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-4.031197</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>LNTRSA</td>
<td>Level 4</td>
<td>-0.232143</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-4.500025</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>LNRESSA</td>
<td>Level 4</td>
<td>-0.092457</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-4.301443</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>LNGCSA</td>
<td>Level 4</td>
<td>-2.644780</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-4.327236</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>LNFDISA</td>
<td>Level 4</td>
<td>-2.848565</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-4.772652</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>TPSA</td>
<td>Level 4</td>
<td>-1.509977</td>
<td>-3.4987</td>
<td>Non-Stationary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Difference 4</td>
<td>-5.888158</td>
<td>-3.5005</td>
<td>Stationary</td>
<td></td>
</tr>
</tbody>
</table>

Source: Annual Data from the Report of Central Banking of Mozambique, 2013

It must be considered that the ADF tests, test the null hypothesis of a unit root, therefore a rejection of the null hypothesis under the ADF means the series do not have a unit root, the result for the ADF tests in table 2 show that none of the series is stationary in levels, since their tests are statistically smaller than the 5 percent critical value, however
all the variables seem to be closer to the stationary, when the test applied the first difference of the series, they all became a stationary suggesting that they are all integrated order one I(1).

In concluding remarks, the seven of the series are first difference stationary I(1), means that the variables are integrated in the same order. As mentioned in the chapter 3 I(1) the variables could be co integrated, so the study carries all the variables forward to cointegration test (See in Appendix C to E).

4.4. Equilibrium Real Exchange Rate in Long Run Relationship

The cointegration test used to examine the long run equilibrium between the variables. The cointegration test is to determine whether there is a long run equilibrium relationship among the RER and its determinants. Cointegration test is based on residual stationary, if residuals are stationary it means that the variables are co integrated and if they are not stationary it means that the cointegration relation does not exist, (Engle and Granger, 1987).

The cointegration relation for the equilibrium real exchange rate is given by the equation below. The cointegration results are shown in the table 4.3, and the ADF unit root test for stationarity of residuals, without trend or intercept is presented on table 4.2, where one can conclude that the residuals are stationary on their level and consequently cointegration among variables is present.
Table 4. 3: Cointegration Test for Equilibrium Real Exchange Rate

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3.034354</td>
<td>0.687823</td>
<td>4.411534</td>
<td>0.0001</td>
</tr>
<tr>
<td>LNFDISA</td>
<td>-0.074732</td>
<td>0.027524</td>
<td>2.715153</td>
<td>0.0091</td>
</tr>
<tr>
<td>LNTOTSA</td>
<td>0.075525</td>
<td>0.055294</td>
<td>1.965897</td>
<td>0.0782</td>
</tr>
<tr>
<td>LNTRSA</td>
<td>-0.149346</td>
<td>0.041999</td>
<td>3.555962</td>
<td>0.0008</td>
</tr>
<tr>
<td>LNGCSA</td>
<td>0.069661</td>
<td>0.065782</td>
<td>1.858970</td>
<td>0.0048</td>
</tr>
<tr>
<td>TPSA</td>
<td>6.148351</td>
<td>0.797140</td>
<td>7.713016</td>
<td>0.0002</td>
</tr>
<tr>
<td>LNRESSA</td>
<td>-0.013553</td>
<td>0.032072</td>
<td>2.022589</td>
<td>0.0044</td>
</tr>
</tbody>
</table>

R-squared 0.953023  Mean dependent var 8.072866
Adjusted R-squared 0.939924  S.D. dependent var 0.489788
S.E. of regression 0.169721  Akaike info criterion -0.592851
Sum squared resid 1.411459  Schwarz criterion -0.339682
Log likelihood 23.59982  F-statistic 68.17390
Durbin-Watson stat 2.059058  Prob(F-statistic) 0.000000

Sources: Annual Data From Report of Central Banking of Mozambique, 2013

The result proved that variables applied in the model are statistically significant to respond to the equilibrium RER the Durbin Watson statistic is 2.0590 is greater than R² and adjusted R² respectively, since are ready to confirm that there is no likelihood of a
multicollinearity problem in that order considered the regression function has good and fit and the cointegration relationship are presented below with the expected sign.

Estimation Equation:

\[
\text{LNRERSA} = 3.0344 - 0.0747^{*}\text{LNFDISA} + 0.0755^{*}\text{LNTOTSA} - 0.1493^{*}\text{LNTRSA} + 0.0697^{*}\text{LNGCSA} + 6.1484^{*}\text{TPSA} - 0.0136^{*}\text{LNRESSA} + \varepsilon,
\]

[equation. 46]

The equation of long run relationship is statistically represented, all the variables in the model the estimated parameters are significantly represented, and with the probability to eject the hypothesis null are less than 5 percent. In equation 3.0343 symbolize if the value of LNGCSA, LNTRSA, LNFDISA, LNRESSA and LNTPSA, were fixed to zero all the variables, the \( \text{LOG(RERSA)} \), would be 3.0343 per unit of real exchange rate. If 1 percent changes on the FDI holding other variables, on average the RER go down by 0.0747 per unit, although a 1 percent change on TOT, holding other variables constant, change on the on average the RER increases by 0.0755, net effect for other variables, while the 1 percent change in TR, holding other variables constant the RER decreases by 0.1493.

The same happens 1 percent change on GC, the RER increase by 0.0697 holding other variables constant, even as 6.1484 holding the influence of other variables constant, on average the RER reduce by 6.1484 per unit of TP change and 1 percent change on RES, net effect for other variables, on average the RER goes up by 0.0136.
The figure above presented two graphs which explained the deviation between actual RER and the equilibrium RER, the actual equilibrium real exchange rate started above of the real exchange rate in first quarter 1991:1 to 1996:4 the actual RER trend to have a regular, the study revealed that in this range has a slight fluctuation, during the period 1997:1 to 2000:1, the actual real exchange rate responds by a regular appreciation of the RER and the equilibrium RER just considered to following the actual real exchange rate, from 1999:2 to 2004:4, the actual RER stagnated decreased again and followed the trend of equilibrium RER.

Table 4. 4: ADF Test for Stationarity for Long Run Residual
### ADF Test Statistic

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(RESIDLR(-1))</td>
<td>-1.699459</td>
<td>0.250716</td>
<td>-6.778430</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(RESIDLR(-1),2)</td>
<td>0.757891</td>
<td>0.178329</td>
<td>4.249963</td>
<td>0.0001</td>
</tr>
<tr>
<td>D(RESIDLR(-2),2)</td>
<td>0.704522</td>
<td>0.148993</td>
<td>4.728563</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(RESIDLR(-3),2)</td>
<td>0.578060</td>
<td>0.142453</td>
<td>4.057893</td>
<td>0.0002</td>
</tr>
<tr>
<td>D(RESIDLR(-4),2)</td>
<td>0.197776</td>
<td>0.111743</td>
<td>1.769922</td>
<td>0.0838</td>
</tr>
<tr>
<td>C</td>
<td>0.034967</td>
<td>0.032344</td>
<td>1.081098</td>
<td>0.2857</td>
</tr>
<tr>
<td>@TREND(1991:1)</td>
<td>-0.000842</td>
<td>0.000954</td>
<td>-0.882300</td>
<td>0.3825</td>
</tr>
</tbody>
</table>

Source: Annual Data from Report of Central Banking of Mozambique, 2013
The decision about the stationary of residuals is based on ADF test, because -6.778430 negative is bigger than the critical value of -3.5005, the conclusion is that the series are I(1) and stationary in first difference. The study shows that the variables are linear combination, there is a co-integrating relationship among the variables.

4.5 Error Correction Model

The cointegration relationships obtained in the previous chapter, the lags and the deterministic trends and intercept assumption used in the cointegration test all specify the long and short run determinants of the RER. However, before we can interpret the results from the ECM. This ECM allows us to distinguish between the long and short run determinants of the RER.
Table 4.5: Short Run Relationship

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.013570</td>
<td>0.013748</td>
<td>0.987011</td>
<td>0.0287</td>
</tr>
<tr>
<td>DLNGCSA</td>
<td>-0.005452</td>
<td>0.043861</td>
<td>-0.124291</td>
<td>0.0016</td>
</tr>
<tr>
<td>DLNTRSA</td>
<td>-0.044470</td>
<td>0.039668</td>
<td>-1.121053</td>
<td>0.0680</td>
</tr>
<tr>
<td>DLNTOTSA</td>
<td>0.110225</td>
<td>0.038850</td>
<td>2.837189</td>
<td>0.0067</td>
</tr>
<tr>
<td>DTPSA</td>
<td>2.574988</td>
<td>0.765977</td>
<td>3.361704</td>
<td>0.0150</td>
</tr>
<tr>
<td>DLNFDISA</td>
<td>-0.039574</td>
<td>0.019811</td>
<td>-1.997594</td>
<td>0.0416</td>
</tr>
<tr>
<td>DLNRESSA</td>
<td>-0.021266</td>
<td>0.015154</td>
<td>-1.403295</td>
<td>0.0171</td>
</tr>
<tr>
<td>RESIDLR(-1)</td>
<td>-0.252056</td>
<td>0.072019</td>
<td>-3.499836</td>
<td>0.0210</td>
</tr>
</tbody>
</table>

R-squared: 0.863992  Mean dependent var: 0.023440
Adjusted R-squared: 0.823735  S.D. dependent var: 0.120170
S.E. of regression: 610.7673  Akaike info criterion: -1.628119
Sum squared resid: 10702569  Schwarz criterion: -1.336143
Log likelihood: -532.7326  F-statistic: 4.365238
Durbin-Watson stat: 1.880770  Prob(F-statistic): 0.000850

Source: Annual Data from Report of Central Banking of Mozambique, 2013

Estimation Equation:

\[
DLNRERSA = 0.0136 - 0.005*DLNGCSA - 0.0445*DLNTRSA + 0.1102*DLNTOTSA + 2.5750*DTPSA - 0.0396*DLNFDISA - 0.0213*DLNRESSA - 0.2521*RESIDLR \ (-1)
\]

[Equation. 47]
The crucial parameter to note in the estimation of ECM is the coefficient of adjustment which, in this research, measures the speed of adjustment in the RER. It can be seen as a measure of the degree of adjustment of actual RER with regard to its equilibrium level. As shown in table 5, this is -0.2520, it is interpreted based on this coefficient, about 25.20 per cent of the gap between the actual RER and its equilibrium values are eliminated every quarter. This result implies that, in the absence of further shocks, the gap would be eliminated approximately 1 year.

In summary all the variables are statistically significant and are presented in the right sign. There are positive and negative relations among the independent to explain the dependent variable. Because the level of GC, TR, RES and FDI affects RER with negative sign in the short run, although, TOT and TP affects the RER with the positive sign.

4.6. Model Validation Test

Once conducted the important test, there is need to test whether the conclusion is significant. For the equilibrium real exchange rate three primary tests were employed the first was the normality probability test plot, stability test and AFC. Regarding the normality probability plot, results in that, there is no space to reject the null hypothesis that the residuals follow a normal distribution and accept the alternative, since the Jacque Bera probability is 49.7917 percent, very higher, as result that the residual follow normality distribution. Looking at the ACF (appendix C), the residual must be bound between $-0.2673$ and $+0.2673$, using the formula [equation. 38]. The regression
analysis does not present any deviation from the interval, meaning that the model is significant; also the stability test proves that the model is good, (see in appendix C)

4.7 Chapter Summary

The chapter presented the results of the study into two views, graphical and regression views, which started by the stationarity tests helpful in the logic that they help avoid spurious regression. Two stationarity tests were undertaken, one for formal and the other for informal test, visual plot and ADF unit root test. The visual plot to test the stationarity of the variables, the first impression that has get from the graphical representation of the variables.

The history of the NER USD and MZM exchange rate and the real, the level of prices adjusted NER USD and MZM exchange rate for the period 1995-August 2011. There are major differences in the nominal bilateral and real bilateral USD/MZM exchange rates owing to accumulated inflation differentials between the two trading partners.

From 1995-2011 the MZM has depreciated against the Rand by 31 percentage points over the period. Much of this nominal depreciation occurred from 2001-2010 when the Rand/MZM rate depreciated by almost 50 percent. Trends in the nominal bilateral euro/MZM exchange rate, pictured in figure 3, indicate a sizable depreciation of the MZM against the euro throughout the 1995 to August 2011 period.

Bilateral movements in exchange rates can be misleading indicators of the overall change in the MZM is value and present nominal effective and the real effective exchange rates for the years 1995-August 2011. The nominal effective rate shown
indicates a significant depreciation in the medical against all its major trading partners over the whole period of more than 50 percent. Just since 2000 alone, the nominal MZM has depreciated by 40 percent.

An outstanding characteristic of MZM exchange rate movements highlighted in this review of the 1995-2010 period has been persistent volatility. Mozambique real exchange rate volatility, employing the most widely used measure for calculating exchange rate volatility, Ī the standard deviation of the first difference of logarithms of the exchange rate. The levels and instability in MZM exchange rates we have observed over the 2000-2010 periods, a negative sign in the undervaluation column indicates overvaluation.

A principal transmission channel through which exchange rate movements affect the economy is via their influence on prices. Used the ADF test for seven series are first difference stationary I(1), means that the variables are integrated in the same order I(1) the variables could be co-integrated, so the study carries all the variables forward to cointegration test.

The result proved that variables applied in the model are statistically significant to respond to the equilibrium RER, since are ready to confirm that there is no likelihood of a multicollinearity problem in that order considered the regression function has good and fit and the long run relationship and the error correction model shows the actual RER and its equilibrium values are eliminated every quarter. This result implies that, in the absence of further shocks, the gap would be eliminated approximately 1 year.
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main purpose of this study was to estimate the equilibrium real exchange rate for Mozambique. Based on the theoretical approaches generally used in the literature, the study has demonstrated a theoretical model which describes the interaction between certain macroeconomic variables and the equilibrium real exchange rate.

This model was then analysed using recent econometric techniques of non stationary variables, the research used the ADF test for stationarity, Engle and Granger cointegration and Error Correction Model, which allowed us to identify several factors that influence the long run relationship among the RER and its theoretical determinants and the dynamic adjustment to the short run relationship to those determinants.

5.2 Conclusions

The results present evidence of a long run relationship existing between the real exchange rate and Terms of Trade, Government Consumption, Foreign Direct Investment, Reserves, Technology and Productivity and Trade Restriction.

The main explanatory variables found in the study is Terms of Trade, a 1percent change in this variable, the Real Exchange Rate respond by an increasing of 6.1484 holding the influence of other variables constant and the explanatory variable that explain less a model id the Trade Restriction, a 1percent change in this explanatory variable, the Real
Exchange Rate decrease at 0.1493, net effect for the rest of explanatory variables. The Nula Hypothesis \((H_0)\): Changes in exchange rates having generated changes in import and export prices. In the case of prices of imports, these shocks affect the pricing chain to consumer prices and producer costs, is not rejected.

The expected sign confirm that, Terms of Trade, present the income effect side, by the of that, the Nula Hypothesis \((H_0)\): Changes in a number of ways, which has an impact on export volumes and sales of import substitutes on domestic markets or firm profits have impact in exchange rates, in not rejected.

Government Consumption, and Technological and Productivity have appositive signal presented by the theory Edwards, Elbadawi and Montiel approach, the rest of explanatory variables such as, Foreign Direct Investment, Reserves and Trade Restriction have a negative signal, which a contradictory with the issues of Edwards, Ebadawi and Montiel say.

Nula Hypothesis \((H_0)\): The change in domestic currency value of foreign assets and liability holdings and can have important consequences for economic growth valuation can have effects on the exchange rate shocks the is rejected.

Nula Hypothesis \((H_0)\): The change in expenditure-switching effects on trade volumes, as countries products and services become more or less expensive relative to foreign goods and services moved the exchange rate, is rejected.
The results of empirical estimations show that the real exchange rate had been depreciated during the period 2000:4-2004:1, whereas it had been appreciated for the period 1994 and slightly depreciated during the period 2005:1-2006:2.

In the period of 2006:3-2010, there was a consistent appreciation of the real exchange rate, important factors that contributed to this result were reforms on the monetary policy, such as introduction of dealers in the market and new mega industries in the economy were built.

In 2006:1-2007:4 the real exchange rate assisted depreciation considerably, resulted in the natural disaster in 2000, the Government expenditure increased but the GDP decreased in scenario extended until last quarter of 2003.

During the 2004:1 the national economy changed due to the new policies, which emphasized on the domestic production, other aspects that contributed of this sign was the change in the monetary policy and new enter in the financial market, microfinance institutions, with the primary objective attending to poor people to alleviate poverty.

From the empirical estimation illustrated that the real exchange rate was over-valuated during the period 2006.3 - 2008.4, while it has been undervalued for the most of the periods between 2001.1 and 2006.2 and consistently under-valuated during 2001.1-2007.1.

The overvaluation period of misalignment had been characterized by the periods of relative political stability, removal of sanctions and integration of the Mozambican
economy into the global market. Along this state the Nula Hypothesis ($H_0$): The exchange rate policy in Mozambique affected positively the economy for the sustainability of the economy, during 2000-2010, is not rejected.

5.3 Recommendations

The result submitted the following important policy suggestions for exchange rate policy in Mozambique, taken together the results of this study have a number of policy implications, first, the presence of long run relationship, cointegration, between the real exchange rate and its determinants found in the study, implies the effectiveness of targeting the one of other variables in influencing the long run behaviour of the other variables. If this interpretation holds and given the significant long run relationship between the real exchange rate and the monetary variables policy variable in the study, such as Reserves, Foreign Direct Investment and Trade Restriction., if it would justify the stance taken by the monetary authorities in Mozambique of pursuing a sound monetary policy and leaving the determination of the real exchange rate of the MZM in the invisible hands of the economy.

Second, the real exchange rate was shocked by the factors outside the direct control of policy makers, such as Terms of Trade, which explaining the variation in the real exchange rate in this study. The policy implication is that the authorities ability to influence the fluctuation in the real exchange rate is limited. The authorities may however reduces the impact of this shock, in long run, y utilising policies to promote the diversification of traded goods and acting on other fundamentals.
Third, the liberalisation trade, more openness, is one of the tools in the policy maker's arsenal to avoid depreciation, both in long and short run. This findings further confirms the posture of the monetary authorities in Mozambique of acting on the fundamentals of the real exchange rate instead of directly managing the exchange rate of the MZM. A word of caution is sounded however that as the effect of shock change from one country to another, there is no universal solution to the problem of fluctuations in the real exchange rate.
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APPENDIXES

Appendix A: Converting Annual Data to Quarters (Lisman and Sandee method)

Lisman and Sandee (1) and later Boot, Feibes and Lisman (2) have developed specific methods for generating quarterly flows which are consistent with the annual data in the absence of any related quarterly series. Lisman and Sandee assume that the quarters (Yₙ) depend upon three annual flows: this year’s flow (Y*ₙ), last year’s flow (Y*ₙ₋₁), and next year’s flow (Y*ₙ₊₁), according to the following linear transformation:

\[
\begin{bmatrix}
Y_{1,1} \\
Y_{1,2} \\
Y_{1,3} \\
Y_{1,4}
\end{bmatrix} = \frac{1}{4} A
\begin{bmatrix}
Y^*_t \\
Y^*_t \\
Y^*_t \\
Y^*_t+1
\end{bmatrix}
\]

To determine the coefficients of the matrix A Lisman and Sandee imposed a number of restrictions, such as that when the three annual data are not on a straight line they are assumed to lie on a sinus curve. These restrictions determine the following coefficients of the matrix which can then be used to generate quarterly estimates consistent with the annual data.
\[ A = \begin{bmatrix} 0.291 & 0.793 & -0.084 \\ -0.041 & 1.207 & -0.166 \\ -0.166 & 1.207 & -0.041 \\ -0.084 & 0.793 & 0.291 \end{bmatrix} \]
Quarterly data for 1991:1 ÷ 2004:4

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Appendix B: ADF Test

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<tr>
<td>Durbin-Watson stat</td>
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<td>0.002993</td>
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</table>

ADF Test Statistic | -2.848565 | 1 percent Critical | -4.1458 |

Value* 5 percent Critical | -3.4987 |

Value 10 percent Critical | -3.1782 |

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<tbody>
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<td>Adjusted R-squared</td>
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### 2. Government Consumption

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<tr>
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<td>-0.410487</td>
<td>0.155207</td>
<td>-2.644780</td>
<td>0.0113</td>
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*MacKinnon critical values for rejection of hypothesis of a unit root.

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<tr>
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<td>0.000631</td>
<td>0.003177</td>
<td>0.198682</td>
<td>0.8434</td>
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</table>

R-squared                  | 0.268488    | Mean dependent var | -0.008641 |
Adjusted R-squared         | 0.168736    | S.D. dependent var  | 0.327413  |
S.E. of regression         | 0.298515    | Akaike info criterion | 0.546878 |
Sum squared resid          | 3.920882    | Schwarz criterion   | 0.812030  |
Log likelihood             | -6.945387   | F-statistic         | 2.691562  |
Durbin-Watson stat         | 1.998926    | Prob(F-statistic)   | 0.025901  |

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<tr>
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<td>D(LNGCSA(-3),2)</td>
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<td>0.000631</td>
<td>0.003177</td>
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<td>0.8434</td>
</tr>
</tbody>
</table>

R-squared                  | 0.562803    | Mean dependent var | 0.002494 |
Adjusted R-squared         | 0.501798    | S.D. dependent var  | 0.456541 |
S.E. of regression         | 0.322242    | Akaike info criterion | 0.702148 |
Sum squared resid          | 4.465111    | Schwarz criterion   | 0.969831 |
Log likelihood             | -10.55370   | F-statistic         | 9.225629 |
Durbin-Watson stat         | 2.035010    | Prob(F-statistic)   | 0.000002 |
### 3. Real Exchange Rate

<table>
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<tr>
<th>Variable</th>
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<td>D(LNRERSA(-1))</td>
<td>1.243019</td>
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<td>9.882474</td>
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<td>-0.984834</td>
<td>0.200668</td>
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<td>D(LNRERSA(-3))</td>
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<tr>
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<td>-6.01E-05</td>
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R-squared         | 0.909284    | Mean dependent var | 0.024256 |
Adjusted R-squared| 0.896913    | S.D. dependent var  | 0.117409 |
S.E. of regression | 0.037697    | Akaike info criterion | -3.591612 |
Sum squared resid  | 0.062526    | Schwarz criterion   | -3.326459 |
Log likelihood     | 98.58610    | F-statistic         | 73.50483 |
Durbin-Watson stat | 2.196364    | Prob(F-statistic)   | 0.000000 |

<table>
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<tr>
<th>Variable</th>
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</table>

R-squared         | 0.811626    | Mean dependent var | 0.004030 |
Adjusted R-squared| 0.785342    | S.D. dependent var  | 0.090013 |
S.E. of regression | 0.041704    | Akaike info criterion | -3.387246 |
Sum squared resid  | 0.074788    | Schwarz criterion   | -3.119563 |
Log likelihood     | 91.68115    | F-statistic         | 30.87830 |
Durbin-Watson stat | 1.655957    | Prob(F-statistic)   | 0.000000 |
4. Terms of Trade

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<tbody>
<tr>
<td>LNTOTSA(-1)</td>
<td>-0.487681</td>
<td>0.158656</td>
<td>-3.073833</td>
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<tr>
<td>D(LNTOTSA(-1))</td>
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<td>0.150572</td>
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R-squared 0.404954 Mean dependent var 0.004197
Adjusted R-squared 0.323812 S.D. dependent var 0.339545
S.E. of regression 0.275946 Akaike info criterion 0.415575
Sum squared resid 3.438426 Schwarz criterion 0.680728
Log likelihood -3.597162 F-statistic 4.990652
Durbin-Watson stat 1.895780 Prob(F-statistic) 0.000564

ADF Test Statistic -3.073833 1percent Critical Value -4.1458
5percent Critical Value -3.4987
10percent Critical Value -3.1782

<table>
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<tr>
<th>Variable</th>
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<th>t-Statistic</th>
<th>Prob.</th>
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<tr>
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<tr>
<td>D(LNTOTSA(-3),2)</td>
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<tr>
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R-squared 0.695720 Mean dependent var -0.003057
Adjusted R-squared 0.653262 S.D. dependent var 0.516903
S.E. of regression 0.304375 Akaike info criterion 0.588067
Sum squared resid 3.983709 Schwarz criterion 0.855751
Log likelihood -7.701682 F-statistic 16.38617
Durbin-Watson stat 1.835843 Prob(F-statistic) 0.000000
5. Trade Restriction

ADF Test Statistic -0.232143 1percent Critical Value* -4.1458
5percent Critical Value -3.4987
10percent Critical Value -3.1782

<table>
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<th>Variable</th>
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<th>Prob.</th>
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<td>-0.394823</td>
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<td>0.2061</td>
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<td>0.007473</td>
<td>1.117580</td>
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</table>

R-squared          0.244420  Mean dependent var -0.018566
Adjusted R-squared 0.141386  S.D. dependent var 0.367979
S.E. of regression 0.340974  Akaike info criterion 0.812856
Sum squared resid   5.115598  Schwarz criterion 1.078008
Log likelihood      -13.72782 F-statistic 2.372235
Durbin-Watson stat  2.061913  Prob(F-statistic) 0.045128

ADF Test Statistic -4.500025 1percent Critical Value* -4.1498
5percent Critical Value -3.5005
10percent Critical Value -3.1793

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<tbody>
<tr>
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R-squared          0.470831  Mean dependent var -0.003712
Adjusted R-squared 0.396993  S.D. dependent var 0.439413
S.E. of regression 0.341220  Akaike info criterion 0.816597
Sum squared resid   5.006531  Schwarz criterion 1.084281
Log likelihood      -13.41493 F-statistic 6.376571
Durbin-Watson stat  2.011082  Prob(F-statistic) 0.000074
6. Reserves

<table>
<thead>
<tr>
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<th>t-Statistic</th>
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<td>LNRESSA(-1)</td>
<td>-0.018123</td>
<td>0.198158</td>
<td>-0.091457</td>
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<tr>
<td>D(LNRESSA(-1))</td>
<td>-0.781026</td>
<td>0.236348</td>
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<td>D(LNRESSA(-2))</td>
<td>-0.493713</td>
<td>0.241437</td>
<td>-2.044892</td>
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<tr>
<td>D(LNRESSA(-3))</td>
<td>-0.472902</td>
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<tr>
<td>D(LNRESSA(-4))</td>
<td>-0.298240</td>
<td>0.193271</td>
<td>-1.543122</td>
<td>0.1300</td>
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<tr>
<td>C</td>
<td>-0.690410</td>
<td>0.427877</td>
<td>-1.613572</td>
<td>0.1138</td>
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<tr>
<td>@TREND(1991:1)</td>
<td>0.022823</td>
<td>0.010304</td>
<td>2.114875</td>
<td>0.0320</td>
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</table>

R-squared: 0.413410  Mean dependent var: 0.016412
Adjusted R-squared: 0.333421  S.D. dependent var: 0.967718
S.E. of regression: 0.790087  Akaike info criterion: 2.493526
Sum squared resid: 27.46643  Schwarz criterion: 2.758678
Log likelihood: -56.58491  F-statistic: 5.168303
Durbin-Watson stat: 2.040533  Prob(F-statistic): 0.000427

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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</thead>
<tbody>
<tr>
<td>D(LNRESSA(-1))</td>
<td>-3.675939</td>
<td>0.854583</td>
<td>-4.301443</td>
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<td>D(LNRESSA(-1),2)</td>
<td>1.851029</td>
<td>0.767333</td>
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<td>D(LNRESSA(-2),2)</td>
<td>1.279848</td>
<td>0.609104</td>
<td>2.101197</td>
<td>0.0415</td>
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<tr>
<td>D(LNRESSA(-3),2)</td>
<td>0.703758</td>
<td>0.411819</td>
<td>1.708900</td>
<td>0.0947</td>
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<td>D(LNRESSA(-4),2)</td>
<td>0.229137</td>
<td>0.202688</td>
<td>1.130491</td>
<td>0.2645</td>
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<tr>
<td>C</td>
<td>-0.863298</td>
<td>0.315055</td>
<td>-2.740148</td>
<td>0.0089</td>
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<td>@TREND(1991:1)</td>
<td>0.027200</td>
<td>0.009137</td>
<td>2.977000</td>
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R-squared: 0.813996  Mean dependent var: 0.002732
Adjusted R-squared: 0.788042  S.D. dependent var: 1.710895
S.E. of regression: 0.787677  Akaike info criterion: 2.489719
Sum squared resid: 26.67869  Schwarz criterion: 2.757402
Log likelihood: -55.24298  F-statistic: 31.36302
Durbin-Watson stat: 2.028891  Prob(F-statistic): 0.000000
7. Technological and Productivity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<tbody>
<tr>
<td>TPSA(-1)</td>
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<td>0.097312</td>
<td>-1.509977</td>
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<tr>
<td>D(TPSA(-1))</td>
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<tr>
<td>D(TPSA(-2))</td>
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<tr>
<td>D(TPSA(-3))</td>
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<td>D(TPSA(-4))</td>
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<tr>
<td>C</td>
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<td>0.075882</td>
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<tr>
<td>@TREND(1991:1)</td>
<td>3.48E-05</td>
<td>0.000236</td>
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R-squared 0.324598  Mean dependent var 0.001525
Adjusted R-squared 0.232498  S.D. dependent var 0.018068
S.E. of regression 0.015829  Akaike info criterion -5.327062
Sum squared resid 0.011025  Schwarz criterion -5.061909
Log likelihood 142.8401  F-statistic 3.524398
Durbin-Watson stat 1.395485  Prob(F-statistic) 0.006193

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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</thead>
<tbody>
<tr>
<td>D(TPSA(-1))</td>
<td>-1.614251</td>
<td>0.274152</td>
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<td>D(TPSA(-1),2)</td>
<td>0.544782</td>
<td>0.214042</td>
<td>2.545214</td>
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<td>D(TPSA(-2),2)</td>
<td>0.482785</td>
<td>0.180152</td>
<td>2.679873</td>
<td>0.0104</td>
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<tr>
<td>D(TPSA(-3),2)</td>
<td>0.501527</td>
<td>0.139063</td>
<td>3.606476</td>
<td>0.0008</td>
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<tr>
<td>D(TPSA(-4),2)</td>
<td>0.021567</td>
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<tr>
<td>C</td>
<td>0.016323</td>
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<td>3.941210</td>
<td>0.0003</td>
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<td>@TREND(1991:1)</td>
<td>-0.000383</td>
<td>0.000117</td>
<td>-3.275918</td>
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</table>

R-squared 0.806573  Mean dependent var 0.001537
Adjusted R-squared 0.779583  S.D. dependent var 0.023773
S.E. of regression 0.011161  Akaike info criterion -6.023564
Sum squared resid 0.005357  Schwarz criterion -5.755881
Log likelihood 157.5891  F-statistic 29.88435
Durbin-Watson stat 1.631893  Prob(F-statistic) 0.000000
Appendix C: Normality Distribution of the Residuals

Source: Researcher Output, Central Bank of Mozambique, 2013
Appendix D: Stability Test ï Recursive Residual

Source: Researcher Output, Central Bank of Mozambique, 2013
Appendix E: Normality Test (Jarque-Bera)

Source: Researcher Output, Central Bank of Mozambique, 2013
Appendix F: Lei Cambial de Moçambique