REAL EXCHANGE RATE BEHAVIOUR IN TANZANIA

By

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A dissertation submitted in partial fulfillment of the requirements for the degree of Masters of Arts (Economics) of the University of Dar es Salaam.

University of Dar es Salaam

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the University of Dar es Salaam a dissertation titled: *Real Exchange Rate Behavior in Tanzania*, submitted in partial fulfillment of the requirements for the degree of Master of Arts (Economics)

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DECLARATION

AND

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I, **INNOCENT MUGANYIZI PANTALEO**, do hereby declare that this dissertation is my own work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature:_____

Date:…….

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No errors and omissions should be blamed on any other person or institution whether acknowledged or not, apart from me.

Innocent Muganyizi Pantaleo.

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Dar es Salaam.

DEDICATION

I dedicate this work to my father, the late Pantaleo Benedict Rweshagara, my mother, the late Apronia Pantaleo Kagemulo and my sisters and brothers. May Almighty God rest the souls of my parents in peace. We miss you a lot.

ABSTRACT

In this study the behaviour of Tanzania's real exchange rate for the period 1966 to 2001 is examined through investigating the determinants of real exchange rate and its misalignment. The period was chosen to cover the years in which the Bank of Tanzania has been under operation. The study has employed econometric techniques of time series, with exchange rate misalignment analyzed using two approaches, the first one being use of the difference between actual real exchange rate and equilibrium real exchange rate and the second one using exchange rate premium as a proxy of misalignment.

The results show that the long run determinants of real exchange rate in Tanzania include debt servicing, openness, terms of trade and reforms. The main hypothesis that periods of major external imbalance, foreign exchange control and fixed exchange rate regime are characterized with exchange rate misalignment which tend to disappear during the period of floating exchange rate regime was not rejected. Hence the conclusion that the period of major external imbalance, foreign exchange control and fixed exchange rate regime in Tanzania was characterized by exchange rate misalignment, which is disappearing during the period under which the economic reforms are being implemented.

In addition, the results show that in the absence of other interventions, actual real exchange rate converge very slowly towards the long run equilibrium level. Hence, the study recommends the use of the nominal devaluation, in the short run as a powerful tool for reestablishing real exchange rate equilibrium.

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List of Abbreviations

AERC	African Economic Research Consortium
ADF	Augmented Dickey Fuller
AGOA	African Growth Opportunity Act
AIC	Akaike Information Criterion
BET	Board of External Trade
BOT	Bank of Tanzania
DEER	Desired Effective Exchange Rate
DF	Dickey Fuller
ECM	Error Correction Model
ERP	Economic Recovery Program
ERER	Equilibrium Exchange Rate
FEER	Fundamental Effective Exchange Rate
FY	Fiscal Year
GDP	Gross Domestic Product
IMF	International Monetary Fund
IRER	Internal Real Exchange Rate
LDC	Less Developing Countries
MRER	Multilateral Real Exchange Rate
NATREX	Natural Real Exchange Rate
NTE	Non Traditional Exports
OGL	Open General License
OLS	Ordinary Least Square
PPP	Purchasing Power Parity
RER	Real Exchange Rate
SIC	Schwartz Information Criteria
TRA	Tanzania Revenue Authority

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Tanzania depends much on agricultural commodities for its export earnings. In fact, the overall economic performance of the country is predicated on the performance of the agricultural sector, with a bearing on other major sectors that provide foreign exchange resources. For example, with poor economic performance, a poor country is faced, ordinarily, with severe foreign exchange shortages, which in turn put pressure on the exchange rate that leads to devaluation and external financing. In Tanzania, following the country's poor economic performance in the late 1970 and early 1980s, exchange rate policy change was invoked in 1986 as a fulfilment of IMF and the World Bank's conditionality for external financing (Lipumba, 1991).[1]

The implications of inappropriate exchange rate policy on a country's economic performance are significant. As some analysts have argued, many of the economic misfortunes suffered by the LDC's during the 1970s and 1980s have been due to inappropriate exchange rate policies and permanent shocks in the terms of trade (Edwards, 1989 and 1994). In consequence, these inappropriate policies cause misalignment of real exchange rate, which is defined as the deviation of the actual (or observed) real exchange rate from the equilibrium real exchange rate (Edwards, 1989).

[1] For further discussion of the causes of poor economic performance and measures taken, see Rutasitara (1996), Wobst (2001) and Bank of Tanzania, Economic bulletins (various issues)

Sustained real exchange rate misalignment is problematic in that it usually results in price distortions and severe macroeconomic disequilibria. Adjustment of the nominal exchange rate was undertaken to correct for exchange risk and real exchange rate misalignment. It was used as well as an instrument of balance of payment management.

The behaviour of real exchange rate, i.e., the outcome of changes in the nominal exchange rate and the domestic rate of inflation, is a reflection of how the exchange rate policy and demand management policies are coordinated. When the exchange rate is overvalued, the demand for imports rises at the expense of exports. Thus, an appreciated exchange rate, in addition to the fiscal position, affects the current account balance, and hence, the magnitude of external debt required to finance the deficit on the current account (Ajayi, 1991).Hence, it is argued that, for better economic performance, countries owe much of their success to policies that are able to maintain the real exchange rate at its "appropriate" level[2]. In this study the behavior of Tanzania's real exchange rate for the period 1966 to 2001 is examined through investigating the determinants of real exchange rate and its misalignment.

1.2. Statement of the Problem

Many third world countries, Tanzania included, faced serious economic problems from the early 1970s through the entire decade of the 1980s. The causes of the poor state of events were many and varied. Among the causes were country's exchange rate policy and poor demand management policies. These two causes reflect the behaviour of real

[2] This is the level at which the deviation of the actual real exchange rate from the equilibrium real exchange rate is negligible, that is, the real exchange rate is neither overvalued nor undervalued.

exchange rate and its misalignment. In general, real exchange rate behaviour and misalignment are said to be important factors in explaining economic performance. Also, they are important in explaining the trend of producers' real prices, a country's export competitiveness, and the flow of investment and, ultimately, the allocation of resources among sectors of the economy in general[3]. If these are sustained, they will reduce over reliance on foreign financing hence reducing pressure for Central Bank policy.

Given the importance of real exchange behaviour in explaining economic performance of countries, several studies have contributed on exchange rate policies and misalignment. In Tanzania, previous studies that have analysed exchange rate behaviour have confined themselves to addressing specific aspects of exchange rate, for example, the Dutch Disease (Nyoni, 1997); the impact of real exchange rate on export performance (Rutasitara, 1996); the choices in the reform period of exchange rate policy (Lipumba, 1991, and Ndulu, 1993); the importance of devaluation as a tool of adjustment (Hyuha, 1990).

Despite the importance of real exchange rate behaviour, to date, no study on Tanzania has modelled and analysed the determinants of real exchange rate and its misalignment. This study attempts to analyse the behaviour of real exchange rate by investigating the determinants of real exchange rate and its misalignment. Moreover, whereas some of the

[3] For more discussion ~~of~~ related to this importance~~these~~ see Rutasitara (1996), Ajayi (1991), Elbadawi (1994), Khan et al. (1987), Waane (2000) and Kidane (1997).

previous studies on Tanzania[4] have used only a single equation approach in cointegration[5] analysis, this study uses also the multivariate equation approach.

1.3. Objectives and significance of the study

The overall objective of the study is to investigate the behaviour of real exchange rate (RER) in Tanzania for the period 1966 to 2001. Specifically, the study attempts to:

i) to highlight various concepts of real exchange rate

ii) to explain the trend of the real exchange rate over the period 1966-2001

iii) to estimate the determinants of real exchange rate behaviour in Tanzania

iv) to estimate the extent of misalignment of Tanzania's real exchange rate for the period 1966-2001

The results as well as recommendations of the study will contribute to the formulation of viable policy options that will enhance the management of exchange rate and lead to exchange rate stabilization and real exchange rate alignment. In addition, the study will add to the literature on real exchange rate in Tanzania and its related aspects.

1.4. Hypothesies.

The main hypothesis of this study is that exchange rate misalignment is positively related to periods of foreign exchange control, major external imbalance and fixed exchange rate regime and negatively related to periods characterised by floating exchange rate regime.

---

[4] See for example, Nyoni (1997) and Rutasitara (1996)

[5] The idea of cointegration states that even though individual series may be non-stationary, there may exist a linear combination of them that is stationary. In other words when a set of series are collectively stationary, we are able to identify short run and long run effects.

Several other auxiliary hypotheses relating to real exchange rate behaviour as detailed in chapter three are also tested.

1.5. Organization of the ~~study~~Study

The study is divided into five chapters. Chapter 2 gives an overview of Tanzania's trade behaviour with the rest of the world and the evolution of indicators of real exchange rate. Chapter 3 elaborates on the methodology, concepts and theoretical issues on real exchange rate, whereas Chapter 4 analyses and evaluates the results. Finally, chapter 5 gives a summary, policy implications and areas for further research.

CHAPTER TWO

TRADE BEHAVIOUR, TRADE PARTNERS AND EVOLUTION OF INDICATORS OF REAL EXCHANGE RATE IN TANZANIA.

2.0. Introduction.

This chapter briefly reviews Tanzania's trade behaviour with the rest of the world, the exchange rate policies undertaken and the real exchange rate indicators. Trade behaviour is instrumental in understanding of the country's competitiveness and in analysing the movement of commodity prices, both of which draw from exchange rate policy.

2.1. Trade Behaviour and Exchange Rate Policies.

During the first ten years after independence, Tanzania enjoyed trade and current account surpluses, which translated into adequate foreign reserves. The main source of foreign exchange was exports of traditional commodities such as coffee, cotton, tea, sisal and cashew nuts, whereas the contribution to foreign exchange reserves of non-traditional exports such as manufacturing products and minerals was very small. This favourable foreign exchange position worsened progressively after the 1960's as imports continued to increase to the extent of surpassing export earnings, with the implication that the country experienced trade balance deficits from 1970's to date. The first balance of payment problem, though minor, appeared in the years 1970-71. This was attributed to a

number of factors, including a sharp rise in imports of mainly capital goods, a decline in agricultural export volumes particularly of sisal and cotton, inordinate delays in shipments of exports, and capital outflows (BOT, 1971).

In response to the problem, the government introduced import and exchange control measures. In addition, the government introduced the Annual Foreign Exchange Plan, the Finance and Credit Plan and the Open General License (OGL) in 1972. OGL (1972) prescribed the list of products that could be imported (depending on the availability of foreign exchange) and specified institutions that were granted sole rights to import specified goods. In spite of these measures, the economy's external payment position did not improve, as it was adversely affected by a series of shocks that depleted the country's foreign reserves[6]. The foreign reserves dropped to very low levels[7] especially between the years 1980 and 1983, in which the country's economic performance was very poor. As foreign exchange became scarcer, OGL was suspended in 1982, so that all imports required the Central Bank's specific licence. A new "OGL" was established with the support of World Bank in 1988 as part of the efforts to support the Economic Recovery Programme (ERP) (1986/90). Further changes in the OGL procedures were made in 1991-92, including expanding the range of eligible product and relaxing 100 percent cash cover requirement (from Rutasitara, 1996).

Up to the 1990s, import licensing was a major tool for allocating foreign exchange to finance imports. Also, during the period of exchange controls, exporters were required to

[6] A series of economic shocks like a rise in oil prices, ~~the higher~~high prices of grain imports in 1973, drought of 1974/75 and 1996/97, El nino of 1997/98, policy induced dimensions - villagisation effects on agriculture, capital and import implications of the Basic Industry Strategy, the break up of the East Africa Community in 1977, 1976/77 the coffee boom (a positive shock) and the 1979 war with Uganda.

[7] ~~The~~ For the trend of Tanzania's foreign reserves, see ~~is given in appendix~~ Appendix 4.

register themselves with the Bank of Tanzania (BOT) and to acquire export licences from the Board of External Trade (BET). Moreover, BOT in collaboration with BET and the Customs department were required to set minimum export prices for particular commodities on weekly basis, and exporters were not allowed to make price quotations below these predetermined prices. However, in July 1993, following the review of foreign exchange regulations, exporters were no longer required to register with the Central Bank or to obtain export licences from BET. The retention policy was also reviewed so as to abolish the surrender requirement and to allow exporters to retain 100 percent of their proceeds (of non-traditional exports) in foreign currency accounts maintained by authorized dealers in Tanzania. A year later, the surrender requirement of the proceeds from traditional exports was also abolished (except for coffee, which also was abolished at later date). All the above measures, together with that of exchange rate liberalization[8], were geared, *inter alia*, at incentivising exporters in a competitive economic environment.

However, the discussed measures have benefited more the category of Non- Traditional Exports (NTE) than that of traditional exports, as the former has been more responsive to changes in the exchange rate (and to other macroeconomic parameters) than the latter. In fact, the exchange rate elasticity of NTE supply with respect to devaluation has been as

[8] From the inception of the BOT in 1965, the Tanzania's exchange rate came under full control of the government up to the 1986 Structural adjustment reforms. A number of institutional changes were initiated to liberalize the exchange rate and trade regimes since 1986. Competition in the financial sector was restored by laying down the legal framework for licensing operations of private and foreign commercial Banks. The Foreign Exchange Rate Act of 1992 and allied subsidiary legislation introduced Bureau de change (April 1992). In July 1993, Foreign Exchange Auctioning was introduced. By June 1994, an Inter-bank Foreign Exchange Market (IFEM), ~~being~~ a daily auction, replaced the weekly auction. In 1995, the Bank of Tanzania Act came into ~~action~~effect.

high as 2.12 (Tarimo, 1996). Earnings from exports of traditional commodities depend more on the increase in the volumes produced than on the devaluation of a currency.

From 1986 to date, the importance of traditional exports as the major source of foreign earnings has declined[9] and the country has started to depend on non-traditional exports as the main source of foreign exchange. For example in 1987, the earnings from traditional exports decreased by 26 percent from USD 280 millions realized in 1986 to USD 207.2 millions, whereas those from non-traditional exports rose by about 70 percent (BOT, 1987). Furthermore, traditional exports declined from USD 231.1 million in the year 2001 to USD 206.1 million in the year 2002. In the same period, the value of non-traditional exports increased by 27.7 percent from USD 545.3 to USD 696.5 million. In 2002, the value of non-traditional exports amounted to 77.1 percent of all merchandise exports as compared to 70.3 percent in 2001 and 55.8 percent in 2000[10] (Economic survey, 2002).

The impact of changes of the exchange rate on the liberalized trade regime on imports depends on the structure/composition of Tanzania's imports which are more of necessities than luxuries and do not have locally produced close substitutes. The main imports are capital goods (that is, transport equipments, machinery and building and construction equipment), raw materials (such as oil and fertilizers) and some consumer

[9] The decline is caused by problems facing the agricultural sector, which ~~are~~include, falling ~~commodities~~ commodity prices in the world ~~prices~~market, unreliable weather, small budget ~~in~~ for the agricultural sector, poor infrastructure and commodity concentration.

[10] The increase of non-traditional exports ~~might have been~~may be attributed ~~by~~ to the discoveries of new mineral sites and increased ~~in~~ production ~~by~~ from the old ~~the~~ mines~~,~~; also, trade liberalization and ~~n,~~ privatization programs ~~which~~ have improved the manufacturing sector and caused growth of the service sector, which ~~was~~ were not performing well. In addition, the increase has come from ~~and discoveries of new~~the export~~s~~ of new products such as fish and fish products, and~~flowers and service sector.~~ horticultural products (Economic survey, various issues).

goods. Implementation of big government projects particularly in power generation and road construction contributes to the increased importation of capital goods.

Tanzania trades mostly with countries with which it has special economic and trade arrangements, namely, countries in the European Union (EU), the South Africa Development Community (SADC), the East African Community (EAC), and with United States of America (USA), especially more recently under its African Growth Opportunity Act (AGOA). Exports of goods to the EU have been increasing in the recent years, from USD 214.7 million in 1999 to USD 473.7 million in 2002 (Economic survey, 2002). In 2002, the exports to the EU market accounted for 52.7 percent of country's total exports of goods, which compares favourably with exports to all African countries (including SADC and EAC) that accounted for only 11 percent of the total export of goods (Economic survey, 2002). The major share of the increase has been from exports of minerals, traditional commodities, fish and fish products, and horticultural products. As for the imports, Tanzania's imports from EU increased by 3.4 percent from USD 344.61 million in the year 2000 to USD 391.05 in 2002, whereas total imports from SADC and EAC member countries decreased from USD 487.78 million in 2000 to USD 308.97 million in 2002 (Economic Survey, 2002). Imports from USA increased from USD 58.92 million in 2000 to USD 91.38 in 2002.

United Kingdom (UK) has been Tanzania's major trading partner for almost all the four decades since independence as both the main source of Tanzania's imports and destination of its export products. Other trading partners whose import and export shares have been significant since independence include USA, Germany, Japan, Netherlands,

Belgium, Italy, France and Kenya[11]. However, there is no single country that has been so dominant as to take more than a half of the trade share with Tanzania.

2.3. Evolution of Different Indicators of Real Exchange Rate in Tanzania

2.3.1. Direct Measures of Real Exchange Rate

This section briefly analyses the evolution of different concepts of real exchange rate indices and prices of Tanzania's major agricultural crops. Prices play a vital role in allocating resources efficiently and in economic performance as a whole. For example, higher prices of tradables are expected to improve the performance of the export sector and hence improvement of current account balance and relax the nominal exchange policies, other things remaining unchanged. This section also, gives the picture of how different policies undertaken in a country affects real exchange rate movements. Two definitions of real exchange rate are used[12]. The second measure of disaggregating the sectors of the economy, in spite being used in number of studies[13], has not been used in modelling the determinants behind the evolution of real exchange rate. This is due to the nature of the Tanzania's producer prices[14] used in this study.

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[11] For the distribution of- export and import shares between Tanzania and the respective ~~the~~ trading partners, see ~~appendix~~ Appendix ~~10a~~ 12a and ~~10b~~12b.

[12] These definitions are defined in chapter three.

[13] This approach has been used in other studies,; ~~see~~ See for instance,; DeGregorio et al. (1994); Kidane (1999) and Wijesinghe (2001)

[14] The prices were not reflecting the trend of crop prices in the world market for most of the period before the producer prices for the main agricultural products were liberalized between ~~FY~~ the financial years 1991/92 and ~~FY~~ 1993/94, hence using these as proxies of real exchange rate movement may give wrong insights of the real exchange rate behaviour. In 1990, the marketing of traditional crops ~~were~~ was liberalized and in 1993 private marketing of all major traditional export crops was permitted. Prior to that period~~Before~~, ~~the producer prices were determined by~~ the Marketing Boards ~~of~~ for the respective crops and the National Pricing Commission (NPC) used to set the producer prices.

Figure 1 shows yearly trends of the real exchange rate index, with an increase in the index showing a depreciation of the real exchange rate and a decrease showing an appreciation of the real exchange rate. A fairly stable trend for the real exchange rate index is depicted between 1966 and 1984; thereafter the index depreciated fast up to 1989. Between 1989 and 2002, the index shows an erratic trend, reaching an all time high depreciation in 1993.

Figure 1:TREND OF REAL EXCHANGE RATE IN TANZANIA USING PRICE INDICES

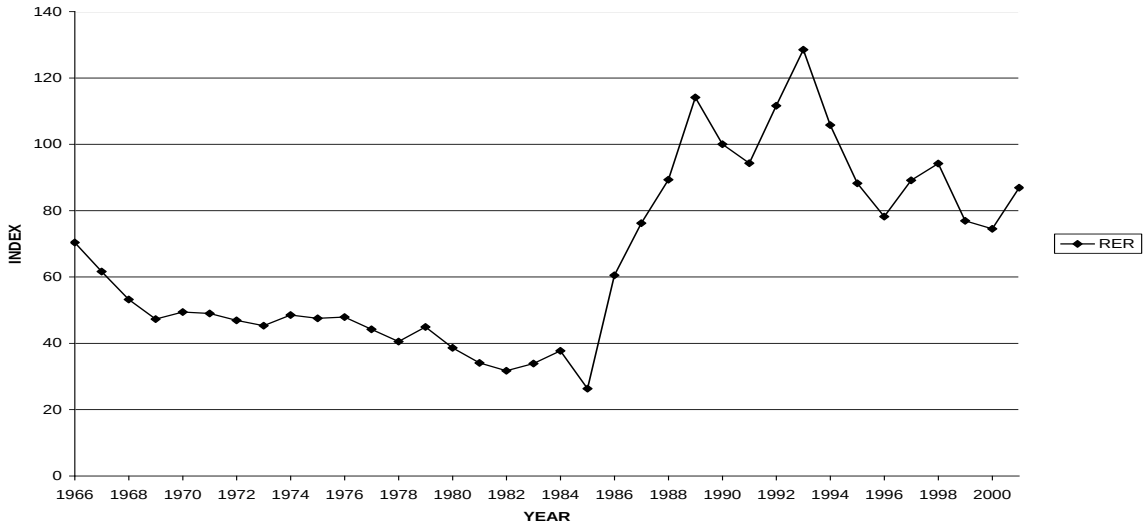


Figure 2 and Figure 3 show yearly trends of the real exchange rate, defined as the ratio of prices of tradables to that of non-tradables, as constructed from prices of crops (the proxies for prices of tradables and non-tradables). As in Figure 1, an increase in the index shows a depreciation of the real exchange rate and a decrease shows an appreciation of the real exchange rate.

Figure 2:TREND OF REAL EXCHANGE RATE IN TANZANIA 1966-2001(COFFEE)

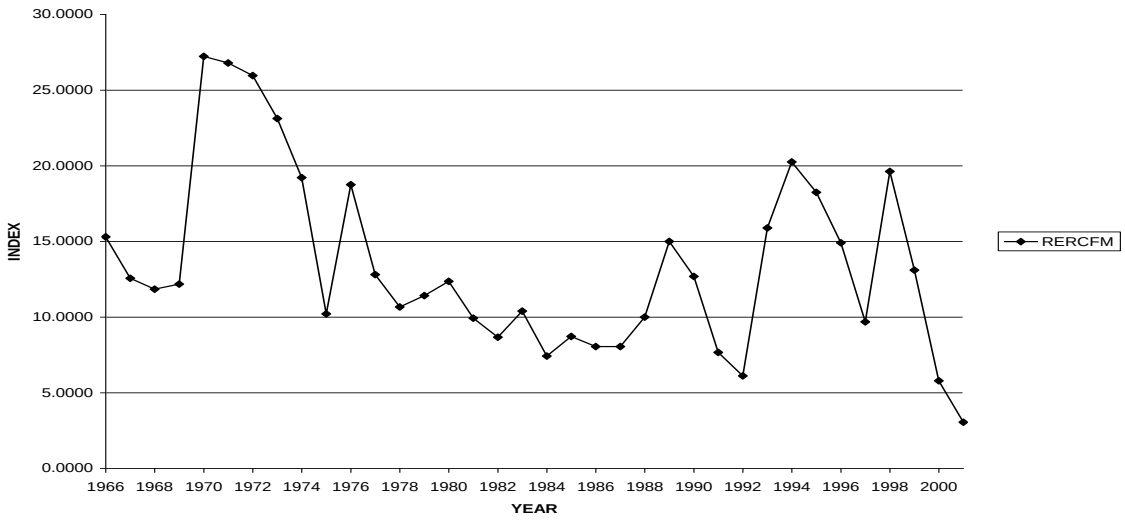
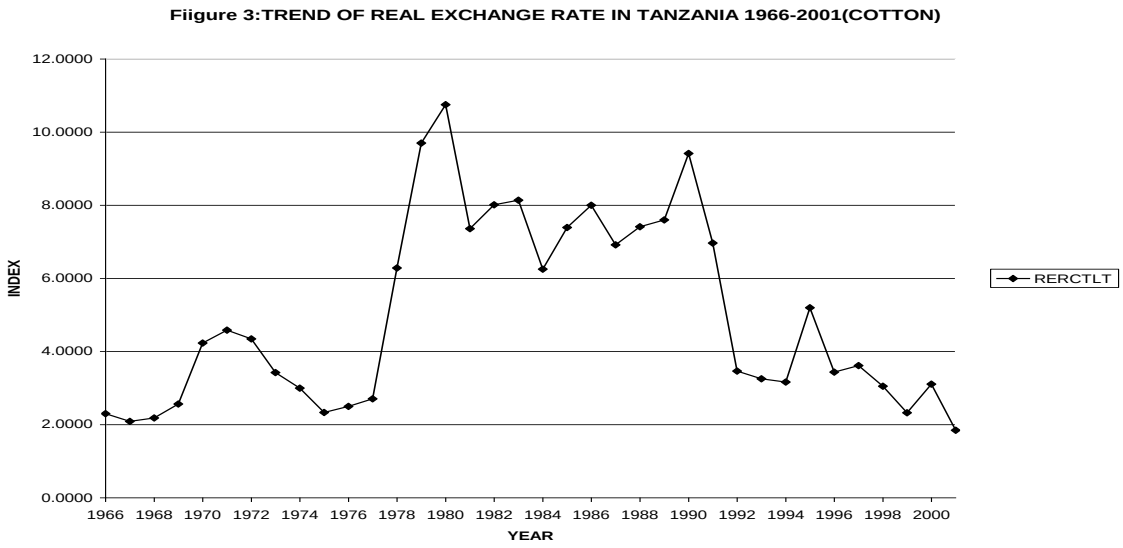


Figure 2 highlights a number of features. The real exchange rate index for Tanzania, with coffee prices as a proxy, shows an appreciating trend between 1966 and 1969, but depreciated very sharply thereafter as to reach an all time high depreciation in 1970. It then showed an appreciating trend up to 1975, whereby it depreciated again in 1976. Between 1977 and 1988, the RER index was fairly stable. However, the real exchange rate index shows an erratic trend after 1988, oscillating between fast depreciation and appreciation.



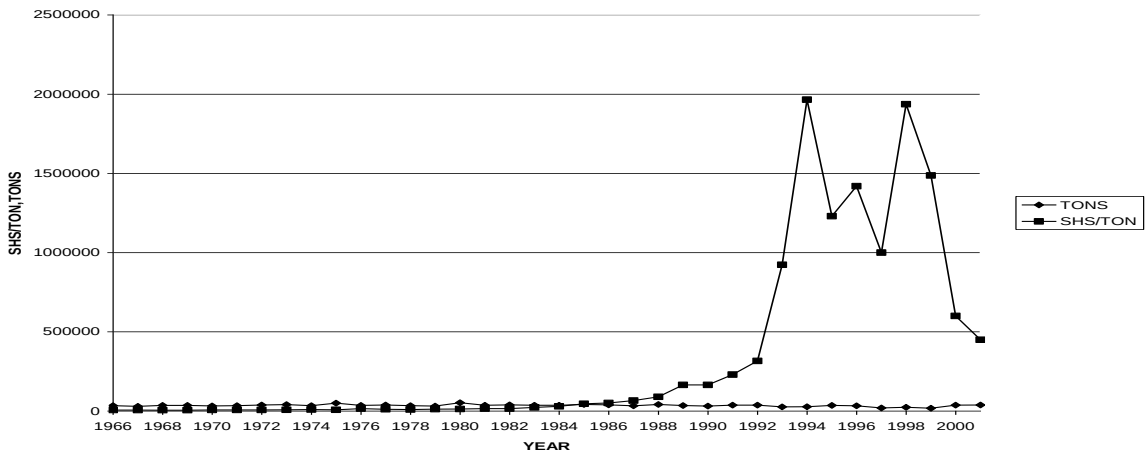
In Figure 3, the real exchange rate index for Tanzania, as based on cotton prices, shows a steady depreciation between 1966 and 1971, followed by a steady appreciation between 1972 and 1975. Thereafter, the index shows sharp depreciation, reaching an all time high in 1980. Between 1980 and 1987 the RER index trend was erratic, but this was followed by a period fast RER appreciation up to 1990. From 1991, the RER is shown to have been fairly stable.

The results with respect to exchange rate policy, such as devaluation, as indicated by the indices in Figures 2 and 3, are puzzling. For example, Tanzania devalued its currency against the dollar by 7.9 percent in 1971 (Waane, 2000). This should have led to the depreciation of the real exchange rate. However, this is shown to have resulted in further appreciation of the real exchange rate for coffee. The situation is similar for the real exchange rate for cotton. In general therefore, the observed trend of RER indices gives a rough picture that the real exchange rates defined by this proxy are behaving contrary to theoretical expectations of real exchange rate behaviour.

Further insights into the importance of the proxy of real exchange rate based on crop prices can be deduced by examining the price behaviour of food and cash crops, which are also used to derive this kind of real exchange rate.

The trends of the prices and quantities of tradable and non-tradable are given in Figure 4 – Figure 10. The trends of prices in these graphs[15] show a fast increase in prices after 1985. This may be attributed to the effects of price policy reforms, which led to liberalization of trade in Tanzania[16]. However, prices of cash crops are shown to have experienced erratic trends, with the exception of the price of tea, which shows continuously rising trend.

Figure 4:TREND OF PRICE AND QUANTITY OF COFFEE IN TANZANIA 1966-2002



[15] The data used to draw the graphs are in ~~appendix~~ Appendices 2 and 3

[16] In the 1986 ERP, an additional Agricultural Adjustment Program was formulated to complement the macroeconomic adjustment process and generate a sufficient supply response. Most domestic market controls on food crops were abolished in 1989, including restrictions on the marketing and transportation of food grains. In 1990 the marketing of traditional crops was liberalized. -.Producer prices for the main agricultural products were liberalized between ~~FY~~ the financial year 1991/92 and the financial year~~FY~~ 1993/94, and in 1993, private marketing of all major traditional export crops was permitted.

Figure 5:TREND OF PRICE AND QUANTITY OF COTTON IN TANZANIA 1966-2001

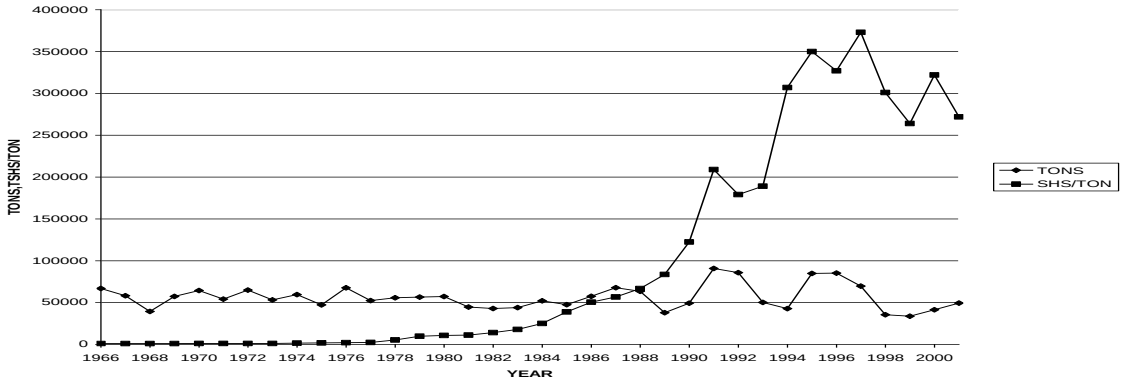
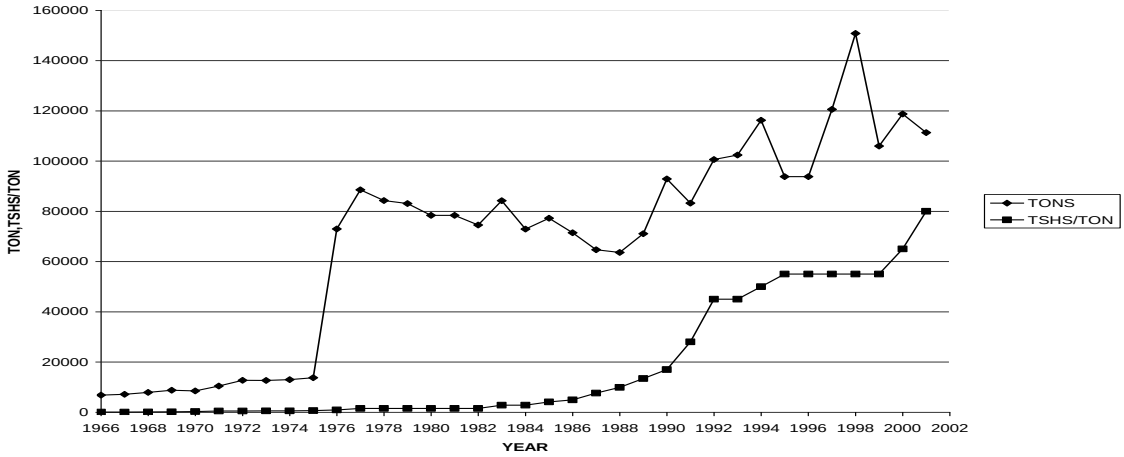
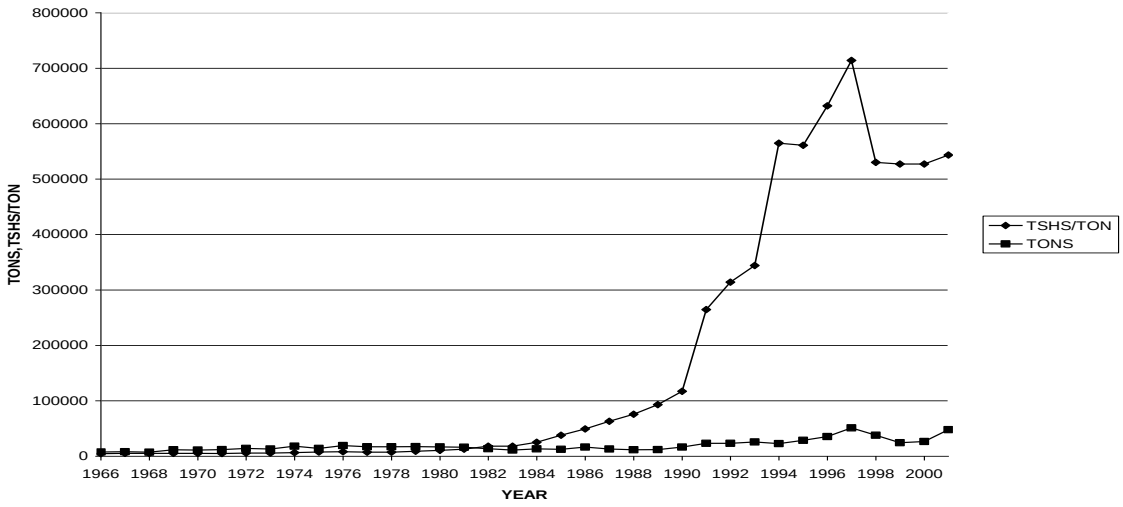


Figure 6:TREND OF QUANTITY AND PRICE OF TEA IN TANZANIA 1966-2001



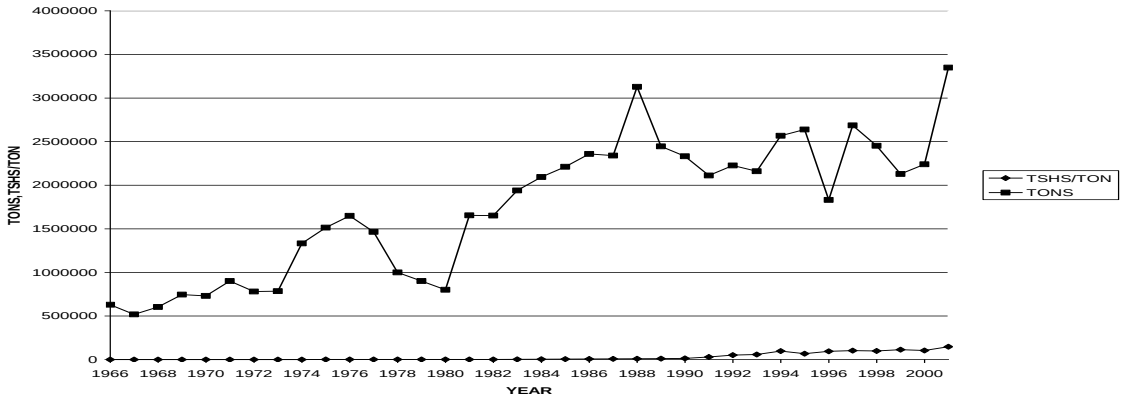
For the case of food crops, the prices show a fairly steady growth after 1985, except for the price of wheat, which shows a sharp increase of price after 1990.

Figure 7:TREND OF QUANTITY AND PRICE OF TOBBACO IN TANZANIA 1966-2001



Looking at the trend of quantity of cash crops produced, almost all cash crops production shows a fairly stable increase in quantity produced, with the exception of tea, which shows a sharp increase up to 1975 that is followed by an erratic trend after.

Figure 8:TREND OF QUANTITY AND PRICE OF MAIZE IN TANZANIA 1966-2001



On the other hand, food crops show a very fluctuating trend in quantity produced since 1966 to 2001. Whereas maize recorded low production in 1967, paddy and wheat recorded low production in 1966 and 1999, respectively.

Figure 9:TREND OF QUANTITY AND PRICE OF PADDY IN TANZANIA 1966-2001

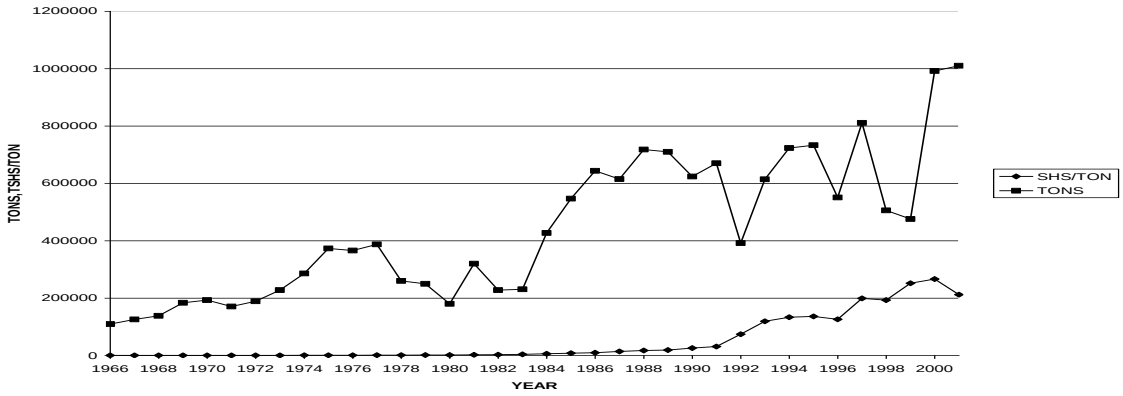
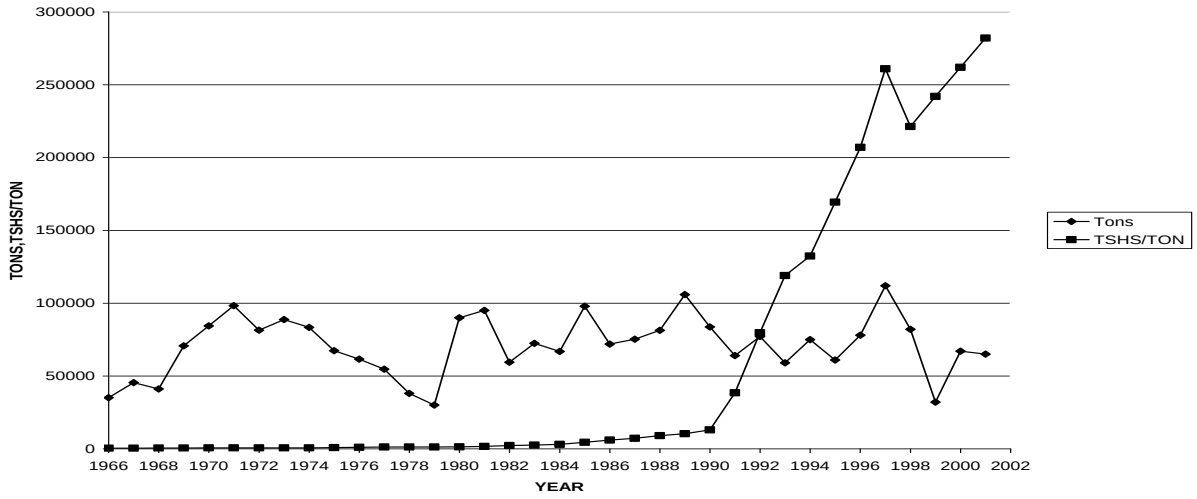


Figure 10:TREND OF QUANTITY AND PRICE OF WHEAT IN TANZANIA 1966-2001



Figures 4 to 10 show that the prices of all crops had a stable movement before 1985. This indicates that prior to the reforms in the agricultural sector, prices were not moving freely according to the behaviour of prices in the world market. Thus, using these prices to reflect the behaviour of real exchange rate in Tanzania might give a wrong interpretation, especially for the period before 1985 that was characterized by price controls.

2.3.2. Indirect Indicators of Real Exchange Rate: Indices of Effective Exchange Rate

This section briefly examines the trends/evolution of the Tanzania's nominal exchange rate indices for selected years. The indices discussed are, the import weighted and the export weighted[17]. The results are summarized in Table 1 and in Figure 11 to Figure 16, which have been drawn using the data in Table 1.

Table 1: *Trends of the Different types of Exchange Rate Indices (Selected Years)*

Year	Import Weighted Exchange rate Index (RERIMP)	Export Weighted Exchange Rate Index (REREXP)	The Reciprocal of the Import Weighted Index (RERINV)	Average of the Export index and Import weighted inverse (RERAV)
1967	8.7160	8.8865	0.1147	4.5006
1970	11.9977	7.2589	0.0833	3.6711
1975	10.2811	6.0956	0.0973	3.0964
1980	12.6972	8.7435	0.0788	4.4111
1985	18.9348	9.9426	0.0528	4.9977
1990	0.7785	161.7379	1.2844	81.5112
1995	0.2742	455.8073	3.6470	229.7271
2000	0.1971	564.7163	5.0730	284.8947
2001	0.2181	433.1883	4.5849	218.8866
2002	0.1879	467.7071	5.3234	236.5152

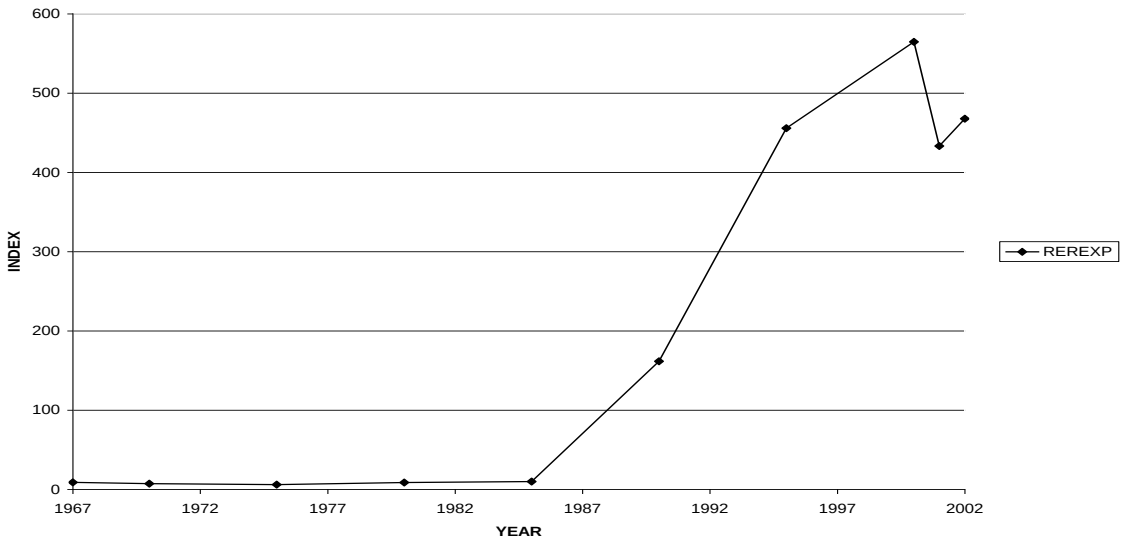
Source: Calculated from the Data in Appendix 12 and Authors calculations.

Figure 11 highlights shows that the export weighted exchange rate index for Tanzania is characterized by a stable trend between 1967 and 1985, thereafter it shows a depreciating

[17] These indices are calculated from the data in Appendix 12a and 12b and using the formulas given in chapter three.

trend that reaches an all time high depreciation in 2000. This is followed by the index's appreciation in 2001 and depreciation in 2002. The depreciation of export index after 1985 indicate that the effect of the reforms on the movement of the country's currency, due to structural adjustment, are likely to have resulted in improvements of the country's export competitiveness. This depreciation might be also attributed to trade and price reforms undertaken in Tanzania as a result of Structural Adjustment Programs. Also, in the period before 1985, the economy was characterized by poor macroeconomic management, which led to an overvaluation of the exchange rate of the currency that might have discouraged export diversification, thereby reducing competitiveness of the country's exports.

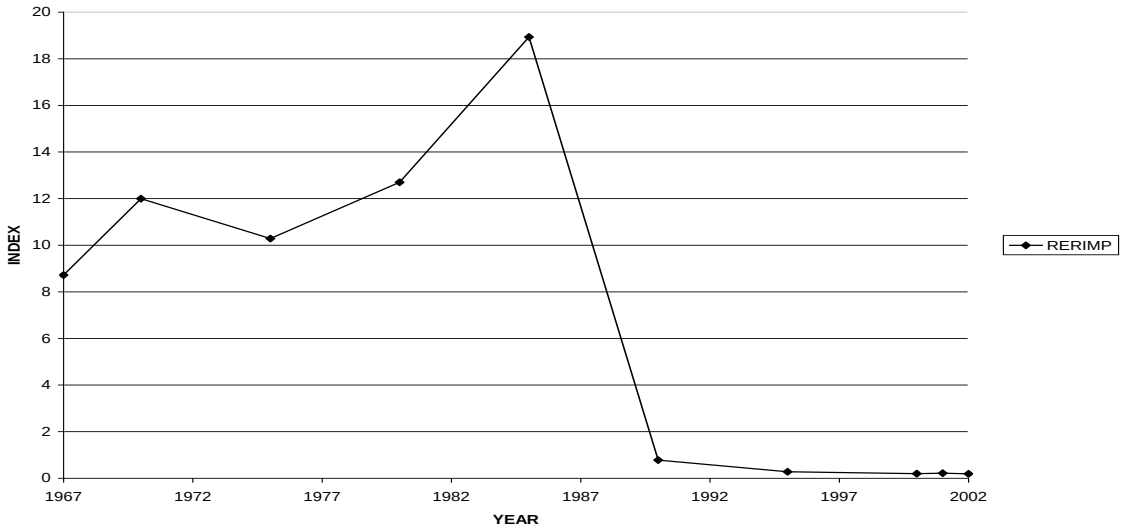
Figure 11:TREND OF EXPORT WEIGHTED EXCHANGE RATE(Selected years)



The import weighted exchange rate for Tanzania (Figure 12) shows a steady depreciation between 1975 and 1985; thereafter it appreciated fast between 1985 and 1990, which was

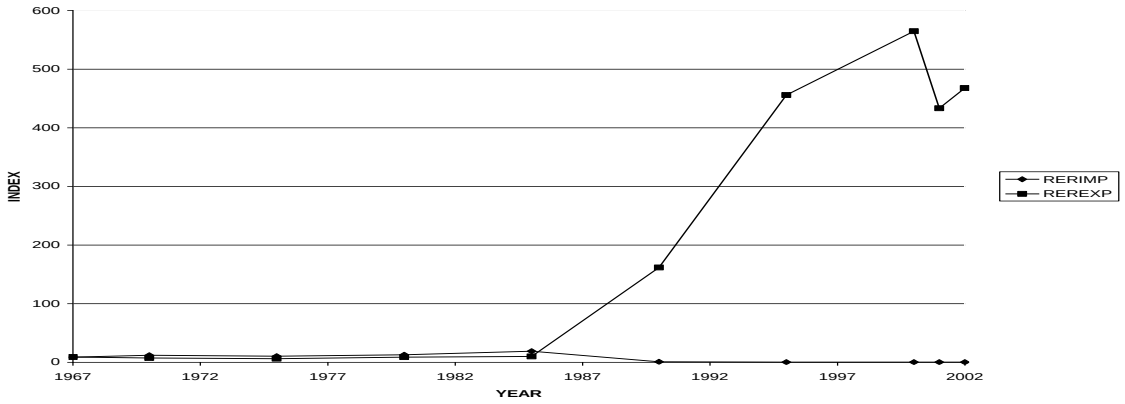
followed by a period of stable appreciation between 1990 and 2002. This import index shows the effects of changes on exchange rate on the cost of imports. The trend of the import index indicates that in the period between 1975 and 1985, the changes undertaken on exchange rate resulted in increasing the cost of imports. However, after the 1985 reforms, the changes resulted in reduction of the country's cost of imports.

Figure 12:TREND OF IMPORT WEIGHTED EXCHANGE RATE IN TANZANIA(Selected years)



In Figure 13 the trend of the Reciprocal of the Import Weighted Exchange Rate is shown to have been steady between 1967 and 1985 and to have an increased between 1985 and 2000 and thereafter reaching its highest point in 2002.

Figure 13:EXPORT AND IMPORT WEIGHTED EXCHANGE RATE (Selected years)



This shows that, as the cost of imports declines due to changes in exchange rate, the country's export competitiveness improves. Also, the results that the index of import is greater than the export index in the period before 1985 indicate that in that period, the country favoured inward oriented trade policy.

Figure 14:TREND OF THE RECIPROCAL OF IMPORT WEIGHTED EXCHANGE RATE(Selected years)

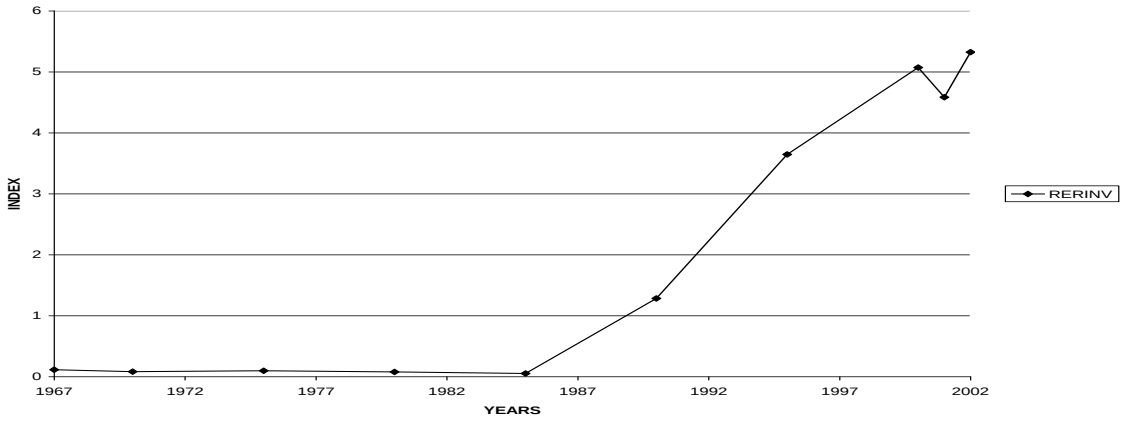


Figure 15:TREND OF THE EXPORT WEIGHTED,RECIPROCAL OF IMPORT WEIGHTED AND THE AVERAGE OF THE TWO INDICES(Selected years)

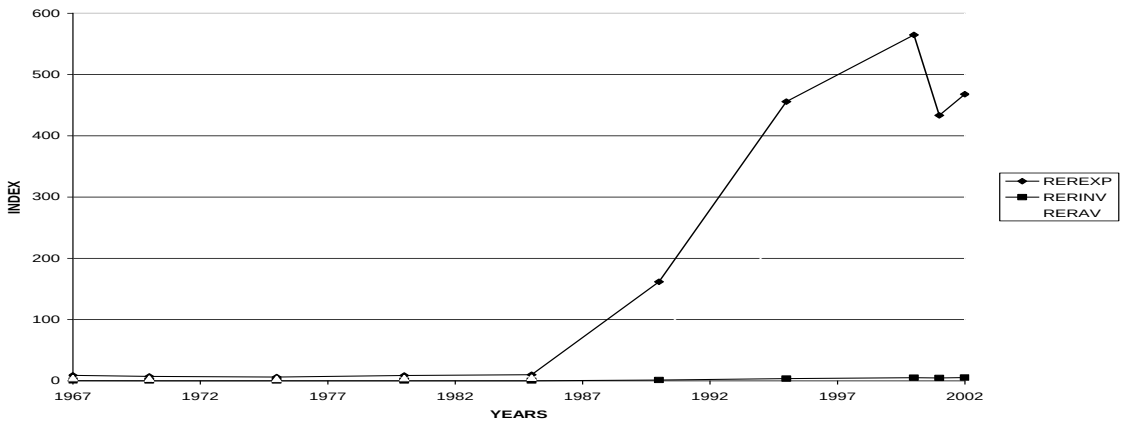


Figure 14 shows the trend of the reciprocal of the import weighted exchange rate, the export weighted index and the average of the two indices. The export weighted and the average is shown to have moved in the same direction, increasing fast from 1985 to 2000 where they reached their peak. The average index shows the overall trade movement as a result of changes in the exchange rate. The index indicates that any changes in the exchange rate have resulted in the improvement of the country's trade with the rest of the world. In general, the trends show that reforms and openness of the economy are very important in explaining the behaviour of real exchange rate.

CHAPTER THREE

REAL EXCHANGE RATE: THEORETICAL ISSUES, CONCEPTS AND METHODOLOGY

3.0 Introduction

This chapter discusses the theoretical issues underlying the real exchange rate and explains various concepts of the real exchange rate. As well, it elaborates on the methodological issues about real exchange rate.

3.1. Theoretical Issues concerning the Exchange Rate

The importance of RER as an indicator of inter-sectoral resource movements and international competitiveness of a country has led to theoretical enquiry into factors affecting its level and changes. Such theoretical works include, among others, Dornbusch (1974), Edwards (1989, 1994), Elbadawi (1989, 1994) and Ndulu (1993).

Traditionally, the benchmark for adjustment of the exchange rate has been based on the Purchasing Power Parity (PPP) definition of equilibrium real exchange rate ($ERER_{PPP}$) level for some base year for which macroeconomic and trade balances are thought to have been in equilibrium. The long run equilibrium real exchange rate (ERER) is affected by variables (fundamental determinants), classified as internal and external fundamentals (Edwards, 1989). Hence, overtime, with current and anticipated changes in the fundamental determinants, ERER[18] changes.

[18] Equilibrium Real Exchange Rate ~~here~~ is defined here as that ratio of the price of tradables to the price of non tradables that~~,~~ results in a simultaneous achievement of both internal and external balances given present and future ("sustainable") values of fundamentals (Edwards, 1989).

The fundamental theoretical determinants of a country's RER, as given in the literature, include commercial policies (trade taxes and non-price measures of both the internal and external trade), the parallel foreign exchange market premium, external terms of trade, international interest rates and transfers and changes in productivity[19]. In the empirical literature, individual researchers focus on fundamentals that are relevant for a given situation. For example, Edwards (1988) concentrated on a class of fundamental determinants that are domestic and susceptible to policy impact. These include the composition of government expenditure, import tariffs, import quotas, export taxes, exchange and capital controls and other taxes and subsidies. Other fundamentals may include terms of trade, change in technology, world real interest rates, among others.

3.2 Concepts of Real Exchange Rate

3.2.1 Direct Measures of Real Exchange Rate

Two approaches are commonly used to define real exchange rate. The first, usually encountered in the theoretical literature, is defined as the relative (or domestic ratio of the) price of tradable goods to non-tradable goods[20] (Edwards, 1989), which alternatively is known as internal real exchange rate (IRER) (Masters and Ianchovichina, 1998). It is expressed as,

(1) $$RER \equiv e \equiv E\frac{P_T^*}{P_N}$$

[19] These factors have been ~~taken~~ drawn from the theoretical studies reviewed above.
[20] Increase means depreciation of the RER and fall means appreciation of the RER.

where P_T^* is an index of the prices of tradable goods , P_N is an index of the prices of non tradable goods and E is the nominal exchange rate.

In empirical applications however, the real exchange is widely defined on the basis of purchasing power parity doctrine as the relative price of foreign goods to domestic goods irrespective of whether goods are tradable or non-tradable. Alternatively, it is defined as the relative price of foreign consumption or production basket to a domestic one (Edwards 1989). This definition is also known as multilateral real exchange rate (Masters and Ianchovichina, 1998). Mathematically, it is expressed as;

$$RER \equiv e \equiv E\frac{P^*}{P} \tag{2}$$

where P^* is an index of foreign price level, P is an index of domestic prices and E is the nominal exchange rate expressed as the local currency price of a foreign currency.

Real exchange rate is computed by adjusting a specified nominal exchange rate for relative inflation in the domestic economy to that in the rest of the world. The objective of this adjustment is to determine the effect on incentive to produce, purchase and store commodities and services (Fosu, 1992). Thus, it is the real worth of foreign exchange in terms of a given domestic currency.

Several advantages and problems are associated with the discussed approaches of real exchange rate (Edwards, 1989; Fosu, 1992; Elbadawi, 1994; Wijesinghe, 2001; Khan et al. 1991; Masters and Ianchovichina, 1998). The definition based on the Purchasing Power Parity doctrine has the following advantages: One is the indication of the relative competitiveness of domestic goods against foreign goods. Two, due to problems of

measuring the relative price of tradables to non-tradables and the simplicity of obtaining data for prices of foreign and domestic goods, this definition is mostly favoured by policy makers and other practitioners.

Despite its advantages, this definition has a number of disadvantages. First, it does not provide precise information on how the relative price impinges on the evolution of the external sector and of different accounts of the balance of payments. That is to say, it fails to take into account the fact that the equilibrium real exchange rate, defined as the relative price of tradable goods to non-tradables, is consistent with both internal and external balances; hence, the using of this definition as a base for correcting macroeconomic disequilibrium may promote rather than prevent such disequilibrium. Secondly, it fails to capture changes in the relative incentives guiding resource allocation across the tradable and non-tradables sectors (Edwards 1989).

Other failures of the definition based on the PPP approach are as follows: The approach lacks standardized good baskets and different price structures in several countries (due to differences in tax systems, tariffs, and other impediments); secondly, the approach shows relatively better performance for studies involving developed countries and failure in most of the studies in developing countries (Michalski, 2003); lastly, in measuring misalignment from a PPP perspective, a base period is chosen in which the economy is thought to have been in equilibrium, and then the RER for that year is taken to be the equilibrium for the remainder of the sample period. However, in theory, RER moves overtime for an economy in equilibrium. Therefore, PPP approach may identify as a

misalignment what in fact may be an equilibrium movement of the RER (Elbadawi, 1994).

The definition of RER that is based on the ratio of the price of tradables to non-tradables is advantageous also in several respects. It also is a good indicator of the degree of international competitiveness of a country's tradable goods sector. Additionally, this definition also summarizes incentives that guide resource allocation across the tradable and non-tradable sector. Lastly, as in PPP, it treats the equilibrium real exchange rate endogenously as a function of other real variables rather than treating it exogenously as a fixed number. This treatment makes the ERER move in response to exogenous and policy induced shifts in its fundamentals, in which case RER misalignment can occur (as in standard PPP theory) when those policies are inconsistent with the fundamentals.

However, the operationalization of this concept of RER is beset with a number of difficulties. ~~First~~The first one is the ~~, are difficulties~~difficulty of categorizing goods and services into tradable and non-tradable sectors. Secondly, the price indices designed to reflect movement of prices of these two categories of goods and services are generally not available, as a result a researcher is faced with a task of identifying the composite price to determine the proper proxies for the prices of tradables and non-tradables. The idea of a price relation between tradables and non-tradables breaks down in a situation where no clear distinction exists between tradable and non-tradable goods. Fourth, it is assumed that the tax is the same for all tradables, which is not true; also in circumstances where import competing goods are not substitutes for imports and where the ad valorem effects of subsidies and trade barriers change, the domestic price of tradable goods is not

linked to the world market price and changes in the domestic tradable-non-tradable price ratio may not accurately be reflected in changes in a real exchange rate. Lastly, when tradable are considered by using the prices of exports and imports, domestic pressure could change both the prices of tradables and non-tradables and the terms of trade. In such a situation, prices of importable and exportable goods ~~prices~~ cannot be combined to obtain results of ~~an~~ the aggregate tradable good~~s results~~.

3.2.2 Indirect Indicators of Real exchange Rate (Indices of Effective Exchange Rate)

Apart from the direct indicators, ~~There~~ there are also indirect indicators of real exchange rate ~~other than the above stated direct indicators~~. These are known as "indices of effective exchange rate" and are categorized into two: Nominal Effective Exchange Rate and Real Effective Exchange Rate. Effective exchange rates are constructed using different weights, depending on the objective of the study or on economic analysis. Kidane(1994) discusses the following indices of effective exchange rate: ~~The~~ the import weighted index; ~~The~~ the bilateral export weighted index; ~~The~~ the bilateral trade weighted index; ~~The~~ the global export weighted index; ~~The~~ the average export weighted index; ~~The~~ the average trade weighted index and the laspeyres-type exchange rate. Among these, the main ones are ~~The~~ the import weighted index, ~~The~~ the bilateral export weighted index and ~~The~~ the bilateral trade weighted index, with the rest being simply extensions of the three.

i) The Import Weighted Index

This is defined as the average price of a partner currency in terms of domestic currency relative to the base period, the weights being the partner's share in total imports of the home country. Symbolically this may be written as

$$EM_i = \sum_j \frac{M_{ji}}{\sum_j M_{ji}} R_{ji} \tag{3}$$

where,

EM_i =The import weighted index
M_{ji} =imports of country i from country j
$\sum M_{ji}$ =Total imports of country i
$1/R_{ji} = R_{ji}$ = price of one unit of country i in terms of currency j expressed as an index

relative to the base period (summation is over all the currency of major trading partners).

ii) The Bilateral Export Weighted Index

This is defined as the arithmetical mean of the price of the domestic currency in terms of partner currencies, relative to the base period, and weighted by the partners' share in the total export of the home country. Symbolically, it is expressed as :

$$EX = \sum \left(\frac{X_{ij}}{\sum X_{ij}} \right) R_{ij} \tag{4}$$

where

X_{ij} =exports of country i to country j

$\sum X_{ij}$ =Total exports of country i

The import weighted index would be useful in studies examining the effect of changes in the exchange rate on the cost of imports, while the bilateral export weighted index may help analyst understand the effect of changes in the exchange rate on the competitiveness of a given country's exports. The bilateral trade weighted index is used as a measure of an overall trade movement. The average trade weighted index shows the change in one structure of trade as a result of changes in the exchange rate, and it is also expected to give some indication about price responses to exchange rate changes. The average trade weighted index is said to be closer to the multilateral effective exchange rate, which uses the general equilibrium approach to obtain an appropriate weight. The above stated indirect measures do not seem to consider some major methodological and conceptual issues involved in the construction and interpretation of various indices; and the indices, moreover, do not differentiate between the nominal and real effective exchange rate.

Kidane (1994) contends that the meaningful interpretation of the various nominal and real exchange rates depends on the combination of four issues, namely, the proper choice of the base period, the proper choice of the weighting and the policy question being addressed, the plausibility of the relative prices or cost indicator, and the mathematical formulation. Thus, there is a need to link economic theory as related to exchange rate movements to the process of index construction. However, this link can be realized only if one considers one issue at a time.

If we adjust or deflate the nominal effective exchange rate for a corresponding change in relative prices, we can isolate the pure exchange rate effect on, for example, export performance and hence obtain the real effective exchange rate. But unlike the nominal effective exchange rate that includes also the effect of inflation differentials between a country under consideration and its partners, the real effective exchange rate may not be used to measure the effect of undervaluation or overvaluation of a currency. In this particular case the real effective exchange rate may be interpreted as a gain or loss of international price competitiveness between the current and the base periods.

Other concepts of real effective exchange rate, explained by Williamson (1994), include the following: The first one is the concept of desired effective exchange rate (DEER), which is defined as the real effective exchange rate at which an economy is in both internal and external macroeconomic balance in the medium term[21]. The next concept is that of fundamental effective exchange rate (FEER). Williamson (1994) recommends an *ex ante* approach for 'estimating a set of real effective exchange rate paths needed to achieve simultaneous internal and external balance by some date in the medium run future and maintain the balance thereafter; (Elbadawi and Soto, 1997). The last one is the concept of the natural real exchange rate (NATREX), discussed by Stein (1994), which is defined as the rate that would prevail if speculative and cyclical factors could be removed while employment is at its natural rate.

In general, the indices of effective exchange rate are used as measures of degree of devaluation of a currency in terms of other currencies while the direct measures of real

[21] The concept is discussed in detail in Bayoumi et al. (1994)

exchange rate basing on the price of tradable and non tradable shows the movement of prices between the tradables and non tradables of a country.

Given the advantages and difficulties of the definitions of RER, real exchange rate is defined in this study as the ratio of the price of tradables to that of non-tradables. This definition has been used in many of the reviewed studies, including for example, Edwards (1988,1989,1994), Ndulu (1993), Grennes and Ghura (1993), Elbadawi (1994), Rutasitara (1996), Kidane (1997, 1999), Nyoni (1997), Mkenda (2001), Wijesinghe (2001) and Rahman et al. (2001). Moreover, in countering difficulties of using this definition, attempts have been made to operationalise it by using proxies. The use of proxies is common in the literature. Edwards (1989), for example, used wholesale price indices of trade partner countries as an index of the price of tradables and the consumer price index of the home country as the proxy for the prices of non-tradables. This is the approximation of internal real exchange rate by an index of multilateral real exchange rate (Masters and Ianchovichina, 1998; Wijesinghe 2001). However, Masters and Ianchovichina's (1998) show that, use of MRER as an approximation of IRER suffers from bias. First, MRER underestimates the impact of a change in an economic fundamental on the RER; and second, the MRER approach harbours a spurious trend towards depreciation. Masters and Ianchovichina (1998) proposed that the bias might be corrected only with disaggregated data on domestic relative prices of tradables and non-tradables. But as noted earlier, this may be complicated by difficulties of identifying commodities between those that are tradable and those that are non tradable. By taking into consideration the Tanzanian setting, this difficulty is partially resolved in this study

by considering a commodity or sector as tradable if more than 10 percent of production is exported and non-tradable if more than 10 percent of production is consumed domestically[22]. Cotton, coffee, tea and tobacco have been taken as tradables since ~~they account for more than 40 percent of Tanzania's total export earnings, and~~ more than 20 percent of total production of each of these commodities is exported; whereas maize, paddy and wheat (the main staple foods) are taken as non-tradables since more than 80 percent of each of these crops is consumed domestically. Thus, the ratio of the price of coffee and cotton to the price of maize is mainly used[23] to show evolutions in RER movement in Tanzania in section 2.3.1. Another definition of the real exchange rate index used for the purpose of further analysis in chapter four and in section 2.3.1 is computed as,

(5) $$RER = {(E_0 * WPI)}/{NCPI}$$

where RER is real exchange rate index, Eo is nominal exchange rate in Tshs/USD1, WPI is Wholesale Price index of Industrialized countries as a proxy of the price of tradables and NCPI is the National Consumer Price Index in 1990 base year as proxy of prices of non tradable.

[22] This approach has been used in other studies, see for instance; DeGregorio et al (1994); Kidane (1999) and Wijesinghe (2001)

[23] The inclusion of only coffee and cotton as tradables and maize as non-tradable is justified due to their relatively large proportions in total output. Coffee and cotton attribute to 55 percent of total production of export crops, whereas maize production constitutes about 77 percent of staple food total production.

3.3 Methodology

3.3.1. Modelling Determinants of Real Exchange Rate

Using evidence from previous studies and theoretical models derived in Edwards (1989, 1994), we postulate a model for this study, based on the works of Rahman et al. (2001). Following the work of Edwards (1989)[24], the dynamics of the behaviour of the real exchange rate are given by

(6) $$\Delta \log e_t = \theta\{\log e_t^* - \log e_{t-1}\} - \lambda\{Z_t - Z_t^*\} + \phi\{\log E_t - \log E_{t-1}\}$$

where e_t is the actual real exchange rate, e_t^* is the equilibrium real exchange rate , Z_t is an index of macroeconomic policies (i.e. the rate of growth of domestic credit) , E_t is nominal exchange rate. The term $\{\log e_t^* - \log e_{t-1}\}$ is the deviation of the actual real exchange rate from its equilibrium level. $\{Z_t - Z_t^*\}$ is the inconsistency in the macroeconomic policy framework and $\{\log E_t - \log E_{t-1}\}$ stands for nominal exchange rate devaluation. θ, λ, Φ, are positive parameters capturing vital aspects of the adjustment process.

From Eqn. (6), let $\{Z_t - Z_t^*\}$ be written as MP and $\{\log E_t - \log E_{t-1}\}$ be given as DEV. Now from the fact that $\Delta \log e_t = \log e_t - \log e_{t-1}$ solving for e_t gives:

$$\log e_t - \log e_{t-1} = \theta \log e_t^* - \theta \log e_{t-1} - \lambda MP + \phi DEV$$

[24] The model basing on Edward's (1989) model has been used in many studies on real exchange rate, among others, for example by are Nyoni (1997), Ndulu (1993) and Sackey (2001), among others.

$$\log e_t = \theta \log e_t^* + (1-\theta)\log e_{t-1} - \lambda MP + \phi DEV$$

(7) $$\log e_t = \theta \log e_t^* + \alpha \log e_{t-1} - \lambda MP + \phi DEV$$

The long run equilibrium real exchange rate is defined as the relative price of tradables to non-tradables (Edwards, 1989), which, for given sustainable values of policy and other exogenous variables, results in the simultaneous attainment of internal and external equilibrium. According to Rahman et al. (2001), four sets of factors determine the real exchange rate. The first is the domestic supply side factor whereby the exchange rate appreciates if relative productivity in the tradable sector increases, because it creates excess demand in the non tradable sector, as well as it improves trade balance. The second relates to fiscal policy, specifically, to the direction of government expenditure between the tradables and non-tradables. The third set of factors is related to international economic environment that includes terms of trade, world real interest rate, world inflation rate and the availability of international transfers. The final set is the commercial policy, which could have important effect on equilibrium real exchange rate.

In Tanzania today, commercial borrowing and private capital inflow is virtually at its infancy. Hence, external transfer becomes exogenous as basically it depends on long run aid disbursement and short run emergency lending by IMF. Moreover, investing abroad is limited due to several restrictions; hence, the world interest rate and the world inflation rate are not so relevant in determining the real exchange rate for Tanzania. On the other hand, debt service to export ratio has an important implication for real exchange rate.

Another variable is central bank reserves, which is important in exchange rate movement since it indicates the capacity of the Bank to defend its currency. Given the above brief analysis of the Tanzanian context, the model that explains the fundamentals of equilibrium real exchange rate for Tanzania can be written as:

(8) $$\log e_t^* = \alpha_0 + \alpha_1 \log(TOT) + \alpha_2 \log(GCONS) + \alpha_3 \log(TEKP) + \alpha_4 \log(OPEN) + \alpha_5 \log(DEBT) + \alpha_6 \log(RES) + \mu$$

where TOT is the terms of trade, GCONS is the government consumption as percentage of GDP, TEKP is the technical progress, OPEN is openness of the economy and DEBT is the debt service as a percentage to exports and RES is the Foreign Exchange Reserves as percentage of imports.

Substituting equations. (8) in (7) gives the model for real exchange rate that explains the fundamentals, which can be expressed as

(9) $$\log e_t = \alpha_0 + \alpha_1 \log(TOT) + \alpha_2 \log(GCONS) + \alpha_3 \log(TEKP) + \alpha_4 \log(OPEN) + \alpha_5 \log(DEBT) + \alpha_6 \log(RES) + \alpha_7 \log DEV + \alpha_8 MP + \log e_{t-1} + \mu$$

where the variables in the equation are as defined before. It should be noted that in estimation and further analysis, the reform dummy variable was included to take to cater for the economic reforms undertaken as a result of Structural Adjustment Programme, which takes the value of zero before 1986 and 1 otherwise.

3.3.2 A prior Expectation of the Variables

The expected theoretical impacts of the respective fundamentals are briefly highlighted below.

Terms of Trade

The impact of a change in the terms of trade on the real exchange rate is theoretically ambiguous (Elbadawi and Soto, 1997; Aron et al. 1997; Edwards 1989 and Sackey 2001). This is because the direct income effect operating through the demand for the non-tradables may dominate the indirect substitution effect that operates through the supply of the non-tradables. Hence, the impact of terms of trade on the RER depends on the relative strengths of the income and substitution effects. If the income effect associated with a terms of trade deterioration is stronger than the substitution effect, a depreciation of RER will occur. Alternatively, if an improvement in the terms of trade occurs and the income effect dominates the substitution effect, then a real appreciation will occur.

Sometimes the indirect substitution effect may dominate the direct income effect. This would lead to opposite results of the effects analysed above. For example, an improvement in the terms of trade may lead to a depreciation of the real exchange rate. Deterioration of the terms of trade will lead to appreciation of the real exchange rate. In Elbadawi and Soto's (1997) study that included seven developing countries, an improvement in the terms of trade appreciated the real exchange rate in three cases and depreciated the real exchange rate in four cases. Aron et al. (1997) also found that an improvement in the terms of trade appreciated the real exchange rate for South Africa.

Trade Policy

The impact of any trade policy that is aimed at increasing trade liberalization is expected to depreciate the real exchange rate. An import quota, for example, reduces openness and usually leads to an appreciated real exchange rate. In this study, the ratio of the sum of imports and exports over GDP is used as a proxy for trade policy. This proxy has been used in most of the reviewed studies (for example, Elbadawi and Soto, 1997; Grennes and Ghura, 1993; Aron et al. 1997; Drine, 2001). This type of proxy is used because it may account for not only explicit commercial policy but also implicit one that includes important factors such as quotas and exchange controls.

Government consumption spending also affects the real exchange rate. The impact of government consumption depends on whether such consumption is predominantly on traded goods or non-traded goods. Increase in government expenditure on non-tradables appreciates the real exchange rate, while that on tradables causes the RER to depreciate. From this, it may be noted that it is not possible to tell *a priori* the effect of changes in government consumption of non-tradables on the equilibrium real exchange rate. In this study, government consumption as percentage of GDP is used as proxy because of difficulties of obtaining disaggregated data on government expenditure for tradables and non-tradables. This proxy has been used in other studies, for example, Sackey, 2001; Drine, 2001; Rutasitara, 1996; Nyoni, 1997; among others.

Central Bank reserves indicate the capacity of the bank to defend the currency (Mkenda, 2001). An increase in reserves has the effect of appreciating the real exchange rate, while a decrease in reserves depreciates the real exchange rate. This study uses the ratio of reserve as percentage of imports, a proxy that has been used in Aron et al. 1997.

Technological progress appreciates the RER if gains emanating from productivity enhancement in the tradable sector override those in the non-tradable sector. In this study, the growth rate of real GDP proxy is used, which was also used by Mkenda (2001). Balassa indicated that the rate of productivity growth is higher in countries with higher rates of growth, and that within these countries, the productivity gains are higher in the tradable sector (Edwards, 1989). The effect of technological progress depends on how technological progress affects different sectors and the type of progress considered, whether product augmenting or factor augmenting (Mkenda, 2001). Thus, technological progress could also depreciate the real exchange rate. The implication is that technological progress could appreciate or depreciate the real exchange rate.

Debt service to export is used in this study and has also been used by Rahman et al. (2001). A permanent rise in the ratio will worsen the sustainability of the current account, and thus requires a depreciation of real exchange rate to restore the balance (Rahman et al. 2001).

Expansionary macroeconomic policy, proxied by the difference between the change of the log of domestic credit over GDP and the real GDP growth rate, causes an appreciation of the RER, other things being equal. Lastly, nominal depreciation termed as *Devaluation* tends to depreciate the real exchange rate. These two variables have also been used in most studies (Sackey, 2001, Nyoni ,1997, Grennes and Ghura, 1993, Aron et al. 1997 and Elbadawi, 1994).

3.3.3 Sources of Data

The study analyses secondary annual time series data for the period 1966 to 2001. The period was chosen to cover the years in which the Bank of Tanzania has been under operation. The study also extends the period covered in the previous Tanzanian studies that have analysed the exchange rate[25]. The choice of the variables was predicated on the theory, availability of data, and consideration of the Tanzanian setting. The main source of data was the IMF International Financial Statistics (IFS), Bank of Tanzania, Economic and Operation report (various issues) and Economic Bulletins (Various issues), Ministry of Planning, Economic Survey (various issues), Ministry of Agriculture, Basic Data and

[25] Rutasitara ~~,~~ (~~-~~1996) ~~(PhD thesis)~~ ~~ended at~~covered the period up to 1990~~,~~ ~~-~~; Nyoni (1997) ~~ended at~~up to 1993; and Ndulu (1993) ~~ended at~~up to 1988.

Annual Crop Review (various issues), National Bureau of Statistics publications, Crop Boards publications, S. Ramadhan (2001) study, and TRA - Custom Department Annual Trade Reports.

3.3.4. Time Series Examination: Unit roots and Granger Causality Test

Time series properties of all variables were ascertained prior to estimation. In this connection, test to detect non stationarity and determine the order of integration of the variables in the model as well as tests to determine the causality between the variables were conducted. The Dickey Fuller and Augmented Dickey Fuller (ADF)[26] tests for the existence of unit roots were used and the results of Unit root tests of the variables in log levels are presented in Appendix 8. These results show that all the variables are integrated of order one, except for devaluation and government consumption that are integrated of order two.

The Granger Causality test[27] on the long run variables given in Equation 8 was pursued for determining causality and the results are summarized in Appendix 10. Generally, the real exchange rate in the long run is said to be Granger-caused by government

[26] The ADF test is virtually the same as the DF test, except the lag length has to be long in order to reflect the additional dynamics that cannot be captured by the DF test and to ensure that the error term is white noise, the ADF is presented as $\Delta Y_t = \alpha + \lambda t + \delta y_{t-1} + \sum_{i=1}^{i} \phi_i \Delta y_{t-i} + \varepsilon_t$, where the lag length i is set to ensure that any autocorrelation in ΔY_t is absorbed. This augmented specification is then used to test the hypothesis that: $H_0 : \delta = 0, H_1 : \delta \langle 0$. The ADF test was run on three lags and insignificant lags were systematically eliminated to finally establish the optimal lag length. The optimal lag length was found to be one in most of the variables in their levels and their differences, otherwise the DF test were used.

[27] This can also be done to test for strong exogeneity. We test for strong exogeneity because the presence of strong exogeneity necessarily implies that weak exogeneity also exists (Johnston and Dinardo, 1997). A variable is said to Granger cause another variable if the past and present information of the variable helps to improve the forecast of the other variable, this involves testing whether the lags of one variable enter into the equation of another variable. Note that the statement does not mean that one variable is the effect or the result of the other; it just measures precedence and information content.

consumption, terms of trade, openness, debt and reform variables. The variables that did not Granger-cause the real exchange rate, namely reserves and technical progress, were not used in long run estimations.

The normality of the variables was also investigated. The resulting descriptive statistics (Appendix 9) show that technological progress and macro policies are individually not normally distributed in levels at 5 percent level of significance; the remaining variables are normally distributed.

CHAPTER FOUR

REAL EXCHANGE RATE: ANALYSIS AND EVALUATION OF RESULTS

4.0 Empirical Analysis

4.1. Cointegration Analysis.

The results of the Granger causality test (which show that the real exchange rate is caused by government consumption, openness, debt, terms of trade and reforms) and the unit root test allow for the direct estimation of the cointegration regression. The variables that were not insignificant in the causality test, i.e., reserve and technical progress, were thereby considered as being not important and were therefore excluded from the cointegration analysis and from the estimation of the long run relationship between the real exchange rate and its fundamentals.

Cointegration analysis was firstly conducted using the Johansen procedure to determine whether there is a long run equilibrium relationship between the variables. These results (Appendix 5) show that the variables form a single cointegrating equation. Given the results of the Johansen procedure and facing a problem of limited observations, Engle-Granger (two-step) single[28] equation procedure was used for further cointegration analysis. The use of a single equation procedure was deemed appropriate, at least with respect to preserving the degrees of freedom.

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[28] The test advocates the use of ADF tests of the following kind:
$\Delta\varepsilon_t = \mu\varepsilon_{t-1} + \sum \mu_i \Delta\varepsilon_{t-1} + \mu + \delta_t + \omega_t$ where $\omega_t \sim IID(0, \sigma^2)$, if the residual is stationary (I(0)) then the variables are cointegrated.

Table 2 gives a summary of the results of the tests for cointegration on the residuals of the long run real exchange rate model. Overall, the results show that the errors in the cointegration regression are stationary, since these tests support cointegration. A comparison of the computed Dickey Fuller, Augmented Dickey Fuller and Phillips-Perron[29] (PP) test results tends to support cointegration between the real exchange rate and its fundamentals.

Table 2: Static Model: Tests for cointegration between RER and explanatory variables

Dickey-Fuller (DF) test on residual	-5.5334 {I(0)}
Augmented Dickey Fuller (ADF) test on residuals	-4.1359 {I(0)}
Phillips-Perron(PP) test on residuals	-5.526 {I(0)}

The presence of cointegration allows meaningful interpretation of the traditional regression results. This implies that "the regression of non stationary series in their levels will yield meaningful, not spurious[30] results" (Cheelo, 2000). The results of the static long run model are reported in Table 3 and equation 10. The dependent variable is defined as the ratio of wholesale price index for industrialized countries as a proxy for the

[29] The PP was run on 3 truncation lags as suggested by Newey-West (1998) and this test is the same as DF test except that there is no requirement that the error term be serially uncorrelated. The restrictive assumption of independence and homogeneity of the error term under the DF test are relaxed under the PP test.

[30] Spurious means that, the conventional t-test will tend to indicate a relationship between the variables when none is present.

Table 3: Determinants of real exchange rate dependent variable (log RER)

Variable	Coefficient	Std.Error	t-value	Beta coeff
constant	2.9757	0.4293	6.93*	
Log(GCONS)	-0.03489	0.03858	-0.90	-0.1688
Log(TOT)	0.2857	0.0991	2.88*	0.2905
Log(DEBT)	0.1853	0.0524	3.54*	0.5785
Log(OPEN)	0.6457	0.1059	6.10*	0.4994
dm1(Reform)	0.7061	0.1419	4.98*	0.8427
R2	0.9215			
F(5,30)	70.45			
DW	1.81			

*Significant at 1 percent
Results are obtained using STATA
Variables are as defined in model specification before.

the price of the tradables to the domestic consumer price index as a proxy for non-tradable times the nominal exchange rate.

The solved static long run model is given below in Equation 10.

(10) ECM = Lrer - 2.97564 + 0.0348381*LGCONS - 0.285789*Ltot - 0.645773*Lopen - 0.185339*Ldebt - 0.705952*dm1;

WALD test: Chi^2(5) = 352.21 [0.0000] **

Results in equation 10 include the Wald Test[31], which rejects the null that all long run coefficients are zero at the 95 percent level of significance.

Taken together, these fundamentals explain 92 percent of the variation in real exchange rate. Furthermore, the results show that that the reform variable, debt servicing, degree of openness of the economy and terms of trade are the important variables affecting real

[31] The Wald test is a test of the null that all long run coefficients, except the constant are zero(Harris,1995)

exchange rate as the coefficient on these variables are strongly statistically significant. The signs on the coefficients are as hypothesized; thus, trade liberalization as reflected by the increase in openness, increases in debt service burden, reforms and terms of trade results in a real depreciation of the currency. Variables directly related to external balance are much more important for LDCs like Tanzania. The signs of the results are similar to those found in most of the studies (for example, Rahman et al. 2001 for Bangladesh, Aron *et al*, 1997 for South Africa, Elbadawi and Soto, 1997 and in Grennes and Ghura, 1993).

It is difficult to ascertain the relative importance of the variables included in the equations using directly the coefficients of the variables estimated, thus beta coefficients[32] are used, with the advantage that they measure the "change in the explained variable (in standard deviation units) for unit change in each explanatory variable (in standard units) holding other variables" (Ajayi, 1991). The beta coefficients are given in Table 3. The coefficients also show that structural reforms undertaken in Tanzania in 1985 tends to be the most important variable (0.8427) followed in descending order by debt services, the degree of openness and terms of trade (0.5785, 0.4994 and 0.2905 respectively). It should be noted that the more the earnings as a result of openness, the higher the ability to service the debt. But as the ratio of debt servicing to export rises permanently, it worsens the sustainability of the current account, and thus requires a real depreciation to restore

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[32] These are defined as $Beta_{xi} = \beta_{xi} * \frac{S_y}{S_{xi}}$, where i=1,2,…., $Beta_{xi}$ is the beta coefficient of the independent variable X_i, β_{xi} is the regression coefficient of variable X_i , S_y is the standard deviation of the dependent variable and S_{xi} is the standard deviation of the variable X_i.

balance. The positive coefficient on the terms of trade variable implies that the substitution effect dominates the income effect. These results are similar to those obtained by Elbadawi and Soto, 1997 and Mkenda 2001. Government consumption is shown to have appreciated the real exchange rate; which implies that government consumption has been largely on non-tradable goods.

Further test were done on the significant variables on the preferred model; the test as to whether the variables are the same in pair was rejected for all the variables. This indicates that none of the pair of variables are equally important.

4.2. Single Equation Error Correction Model: Estimation and Results

In order to capture the short run determinants of real exchange rate, the error correction model was estimated. The error correction terms were obtained from the solved static long run equation (which is reported as Equation 10). In the error correction model, all the stationary variables in the model were included to capture the short run dynamics. The lag length of one in the Over- parameterized model[33] was used, and the preferred model was achieved using Hendry's procedure of "General to Specific modeling" by dropping the variables that were mostly not significant and not consistent with theory and by looking at the diagnostic tests of each estimated equation. Results of the over-parameterized and Parsimonious Model are reported in Appendices 6 and 7, respectively. None of the diagnostic tests reported for the preferred models are significant at 95 per

[33] The preferred lag length were decided using the AIC and SC criterions and both the criteria passed the lag reduction, given limited observations, we started with lag 2.The AIC and SC for lag 2 are -4.8161 and -3.5794 respectively and for lag 1, the AIC and SC are -4.15977 and -3.2895 respectively.

cent critical value (except the F-test that all the slope coefficients are zero). Therefore, there is nothing to suggest that the preferred model is mis-specified. In measuring autocorrelation[34], Autoregressive Conditional Heteroscedasticity (ARCH) was used. This choice was done because the study had employed the lagged dependent variable of real exchange rate whereby in this case the standard Durbin Watson statistic is not valid.

The results of the error Correction Model shows that, in the short run, devaluation and the terms of trade, openness and debt, all in the current period, and reserve and debt lagged once and the error correction term are highly statistically significant. As in the long run case, technical progress was found to be statistically insignificant. Reform variable was also shown as being not important in the short run.

A notable issue is on the coefficients of devaluation and lagged RER. The coefficient on devaluation indicates that even with all other things given, a nominal devaluation has been transferred in a less than one to one real devaluation in the first year. However, the size of this coefficient is quite large, which tend to support the view that a nominal devaluation can indeed be a quite powerful device for re-establishing real exchange rate disequilibrium. The coefficients of lagged RER implies that in the absence of other intervention, actual real exchange rate converge very slowly towards the long run equilibrium level.

[34] This refers to a situation whereby OLS assumptions that errors corresponding to a different observations are uncorrelated. It is common in time series that errors associated with observations in a given period carry into future periods.

4.3. Real Exchange Rate Misalignment

Two approaches were used to estimate the degree of misalignment. Firstly, the long run estimates of the fundamentals were used to obtain the fitted values of the equilibrium real exchange rate. Then the Hodrick-Prescott filter was used to decompose the fitted values into their temporary and permanent movements. The results after filtering the fitted values are then considered as equilibrium real exchange rate and are then taken to be the permanent movement in the filtered series of the real exchange rate. The misalignment in the real exchange rate was then calculated as

(11) $$e_{mis} = RER - ERER \big/ ERER$$

where, RER is the actual real exchange rate, and ERER is the equilibrium real exchange rate. This approach is used also by Mkenda (2001) and Elbadawi and Soto (1997). The negative sign implies overvaluation, while the positive one implies undervaluation of the exchange rate. Overvaluation can result from expansionary monetary policies and fiscal policies of the government (aimed at maximizing growth) and governmental industrial promotion strategies, such as imposing high duties and quotas or bans on imports of industrial goods that compete with those produced by domestic industries (Ajayi, 1991). Also, the quantitative restrictions that are introduced in the allocation of foreign exchange are essentially the result of an overvalued domestic currency (Kidane, 1997). The calculated percentages of the misalignment for the real exchange rate are reported in Table 4. Second, the parallel market premium obtained as

(12) $$PREM = \left(E_p - E_0\right) \Big/ E_0 \left(percent\right)$$

were used ,where PREM is the parallel market premium as a proxy for misalignment, E_0 is the nominal exchange rate in Tshs/USD and E_p is the unofficial (parallel) market nominal exchange rate in Tshs/USD (compiled from Rutasitara, 1996) and Bureau de change exchange rate was used as proxy for parallel market exchange rate from 1995 to 2001. The PREM proxy measures misalignment in the RER, distortion in the foreign exchange market and the degree of exchange control and import rationing in the economy. The calculated value is also reported in Table 4.

Basing on parallel market premium, the real exchange rate misalignment was at its worst in 1985. This is probably due to the introduction of own funded import scheme amidst the overvalued shilling and passive exchange rate policy. The years 1970, 1971, 1972 and 1973 witnessed a trend characterized by an increasing premium. These were the years in which exchange rate controls were enforced, following the 1970/71 balance of payments (mini) crisis. In 1974, the premium reduced; thereafter it started rising in 1975, 1976 and 1977. Probably, this was initiated by the 1974/75 balance of payments crisis and sustained thereafter by a continuation of tight exchange controls, despite the 1976/77 coffee boom. By the end of 1977, exchange controls were relaxed, but were tightened again in 1979. Thus the premium increased in 1980. The premium stayed at the average level of about 321.8 percent for the period between 1980 and 1985. This period was characterized by persistence of balance of payment crisis, passive exchange rate policy and exchange controls. The premium started disappearing from 1986 until year 2001.

This was the period of active exchange rate policy and other market oriented economic reforms. It is worth-noting that the premium is shown to resurface after 1995. This may be because the Tanzanian shilling has experienced a fast depreciation in the reform period, and thus a shilling is likely to still be correcting itself to the equilibrium level, thence it is still overvalued.

The computed index of misalignment basing on equilibrium real exchange rate gives results that are somehow puzzling. For example, showing misalignment in periods that the country's real exchange rate was expected to be in equilibrium, notably the period 1968 to 1970 when a country had a relatively better external balance. The index indicates that the real exchange rate was overvalued during the period 1968 to 1973 and the period 1980 to 1985 with highest overvaluation in 1985. These are the periods (i.e. 1971-1973 and 1980-85) when the Tanzanian economy was going through economic crises, with import restrictions and exchange controls. In most of the rest of the whole sample period, the real exchange rate was slightly undervalued.

As argued earlier, the quantitative restrictions that are introduced in the allocation of foreign exchange are essentially the result of an overvalued domestic currency and perhaps this might have been the cause of overvaluation of Tanzanian shilling in the periods characterized by exchange controls.

The trend of the misalignment indices supports the study's main hypothesis that during the period of major external imbalance (the periods 1971-1973 and 1980-1985), foreign exchange control and fixed exchange rate regime was characterized by exchange rate

Table 4: Computed Real Exchange Rate Misalignment (Percentage)

YEAR	mies	PREM
1966	4.27	20.45
1967	1.84	21.85
1968	-0.96	19.05
1969	-3.09	21.85
1970	-1.19	41.46
1971	-0.59	62.46
1972	-0.87	115.69
1973	-0.88	106.55
1974	1.84	89.34
1975	2.24	179.51
1976	3.38	161.34
1977	2.03	159.35
1978	0.30	69.91
1979	3.50	45.20
1980	-0.53	214.18
1981	-4.20	323.91
1982	-6.91	367.67
1983	-6.34	255.48
1984	-5.29	292.41
1985	-16.66	476.99
1986	1.80	412.23
1987	4.57	180.11
1988	5.58	111.50
1989	8.75	88.31
1990	3.66	69.18
1991	0.78	68.83
1992	3.36	46.12
1993	5.74	22.14
1994	1.24	3.23
1995	-2.59	3.53
1996	-4.77	4.87
1997	-1.21	3.08
1998	0.91	0.12
1999	-2.63	0.18
2000	-2.32	0.91
2001	2.24	0.10

misalignment and during the period of floating exchange rate regime the misalignment was disappearing.

In general, the episodes of overvaluation are predominant. But the adequacy of the results to depict the actual overvaluation in Tanzania will of course depend on the reliability of data used. Also, although tracking the long run equilibrium is tricky, the methods used have been able to provide at least a crude estimate of the real situation. The study's results compare with those obtained by Rahman *et al* (2001) for Bangladesh.

CHAPTER FIVE

CONCLUSION

5.1 SUMMARY AND POLICY IMPLICATIONS

This study set out to show the behaviour of real exchange rate by finding the determinants of the real exchange rate, giving different concepts of real exchange rate, and estimating the degree of misalignment in the real exchange rate in Tanzania. The importance and difficulties of different approaches of real exchange rate are well documented in the study. The study covered the period 1966 to 2001 during which the economy has passed through different economic and policy revolutions, with two extreme sub-periods.. In one sub period, i.e., 1966-1985, the economy was operating under price and exchange controls, whereas in another, i.e., 1986-2001, the country was implementing structural reforms aimed at liberalizing the economy.

First, a brief analysis of trade behaviour of Tanzania with the rest of the world followed by a discussion on the concepts of real exchange rate was undertaken. It is shown that from 1985, Tanzania has shifted from depending on traditional commodities to non-traditional commodities as the main source of foreign exchange earnings. A descriptive analysis and comparison of different concepts of real exchange rate analysis were also undertaken in the study explaining the advantages and disadvantages of each definition.

An econometric model was estimated to establish the relationship between the real exchange rate and its fundamentals. It was found that debt servicing, openness, terms of trade and reforms were the most important determinants of real exchange rate in the long run. In estimating the error correction model to determine the short run determinants of

real exchange rate: reserve, devaluation, terms of trade, open, debt and macro policies were found to be the short run determinants of real exchange rate. In the error correction model, Granger Causality test, and in estimating long run relationship, technical progress was found to be not important determinant of real exchange rate. Most of the important variables were found to support the theory. Analysis of misalignment was undertaken using two approaches; the first one is the use of the difference between actual real exchange rate and equilibrium real exchange rate and the second one used the exchange rate premium as a proxy of misalignment. The long run equilibrium real exchange rate was obtained from the permanent component of the fitted values of the real exchange rate in the cointegration analysis. The results supported the main hypothesis of the study.

Specific policy implications emanate from the results. It can be deduced that during the period when the country is faced with high burden of debt servicing, policy that aims at depreciating the real exchange rate has to be undertaken to restore current account balance. To reduce the debt burden and increase the debt servicing capacity, an increase in exports and reduction in world interest rates is required. Thus, two externally important policy areas, in this respect are real interest rates and protectionism. Also for better performance of the economy, trade liberalization reflected by the degree of openness and reforms should be undertaken, since they have been found to have a significant impact on the real exchange rate, which is considered as one of the main ingredients of country's better economic performance. Policies that aim at improving the terms of trade might be useful for better performance of the economy since this results in real depreciation and hence reduction in the misalignment.

Also from the results of the error correction model, the significance of the error correction term and the significance of the rates of change of terms of trade, open, debt, macro policies, reserve and devaluation to the rate of change of actual real exchange rate suggest possibilities for policy actions to correct misalignment. In the short run, nominal devaluation can indeed be a quite a powerful device for re-establishing real exchange rate disequilibrium.

5.2 Areas for further work and limitation of study

The focus of this study was on the definition of exchange rate basing on Edwards (1989). A study on other concepts of real exchange rate would also be beneficial in understanding real exchange rate in Tanzania. An empirical analysis involving different concepts of real exchange rate given in the study, for the Tanzanian setting could be an added value to studies of real exchange rate behaviour in Tanzania.

Another area of interest would be to carry out research on the effects of misalignment of real exchange rate on Tanzania's economic performance.

Lastly, future studies may wish to focus on the decomposition of the determinants of real exchange rate into short run and long run categories. Investigation of the determinants of real exchange may be undertaken for the separate sub-periods so as to identify the important variables during the reform period using different proxies of prices of tradables and non-tradables.

The study was limited by the availability of the data. Tanzania like any other less developed countries faces the problems of data, including coverage, timeliness,

availability and accuracy of secondary data. Worse still, different sources tended to give different data on the same variable. Although the methodology used instil confidence in the results, the data used were not necessarily good enough. The sample was small even though this problem is common to annual time series data on African countries.

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APPENDICES

Appendix1: **DATA USED IN REGRESSION ANALYSIS**

YEAR	GCONS	RES	dev	tekp	rer	dm1
1966	0.185	24.14	7.14	11.1	70.4	0
1967	0.200	25.15	7.14	4	61.6	0
1968	0.210	28.54	7.14	5.2	53.2	0
1969	0.232	31.69	7.14	1.8	47.3	0
1970	0.266	17.65	7.14	5.8	49.4	0
1971	0.288	12.02	7.14	4.2	49	0
1972	0.296	25.95	7.14	6.7	46.9	0
1973	0.378	25.02	7.02	3.1	45.3	0
1974	0.488	6.39	7.13	2.5	48.5	0
1975	0.578	8.27	7.37	5.7	47.5	0
1976	0.663	16.67	8.38	6.6	47.9	0
1977	0.713	37.00	8.29	0.4	44.2	0
1978	0.906	8.05	7.71	2.1	40.5	0
1979	0.943	5.83	8.22	2.4	44.9	0
1980	0.845	1.61	8.18	3	38.6	0
1981	0.943	1.40	8.28	-0.8	34.1	0
1982	1.236	0.42	9.28	0.6	31.7	0
1983	1.485	2.42	11.14	-2.4	33.9	0
1984	2.107	4.25	15.29	3.4	37.7	0
1985	2.700	1.87	17.47	4.6	26.3	0
1986	3.373	5.94	32.7	1.9	60.5	0
1987	7.566	3.43	64.26	4.9	76.2	1
1988	11.056	9.54	99.29	4.1	89.3	1
1989	12.753	5.30	143.38	4	114.1	1
1990	17.774	14.14	195.06	4.5	100	1
1991	23.430	13.18	219.16	3.6	94.3	1
1992	29.594	20.77	297.71	3.5	111.6	1
1993	35.327	12.47	405.27	3.7	128.5	1
1994	40.332	21.13	509.63	1.4	105.8	1
1995	45.346	15.14	574.76	3.6	88.2	1
1996	40.977	30.67	579.98	4.2	78.2	1
1997	37.685	45.50	612.12	3.3	89.1	1
1998	38.008	40.19	664.67	4	94.2	1
1999	37.753	48.81	744.76	4.7	76.9	1
2000	37.789	63.09	800.41	4.9	74.5	1
2001	38.969	66.70	876.4	5.7	86.9	1

Source:IMF;International Financial Statistics(IFS)-(Various issues) ,Bank of Tanzania;Economic and Operation Reports(various issues),S.Ramadhani(2000),Authors computation.

Appendix 1 Continues

year	rerav	tot	MP	open	debt
1966	8.80	112	-0.0859	0.5091	2.22
1967	7.33	110	-0.0648	0.4678	2.67
1968	7.01	94	-0.0691	0.4512	2.68
1969	7.37	103	-0.0583	0.4192	1.82
1970	15.73	79	-0.0352	0.4438	2.5
1971	15.69	70	-0.0232	0.4727	2.93
1972	15.15	80	-0.0570	0.4651	2.85
1973	13.27	74	-0.0552	0.4625	2.83
1974	11.11	54	-0.0067	0.5161	2.5
1975	6.27	48	-0.0065	0.4457	3.29
1976	10.63	69	-0.0220	0.3699	2.66
1977	7.76	68	-0.0686	0.3588	2.91
1978	8.48	42	-0.0042	0.3875	4.72
1979	10.56	45	0.0051	0.363	5.88
1980	11.56	41	0.0186	0.3443	5.56
1981	8.65	48	0.0199	0.2942	5.97
1982	8.34	39	0.0219	0.2364	12.77
1983	9.27	47	0.0181	0.1899	21.07
1984	6.84	45	0.0182	0.1644	27.48
1985	8.06	29	0.0264	0.1713	52.85
1986	8.03	37	0.0522	0.2821	55.9
1987	7.48	31	0.0997	0.2363	78.17
1988	8.71	33	0.1238	0.213	87.63
1989	11.30	35	0.2359	0.3127	49.7
1990	11.05	24	0.3527	0.3979	48.53
1991	7.32	22	0.4316	0.3809	56.23
1992	4.79	28	0.5653	0.4186	39.75
1993	9.57	29	0.8005	0.462	34.22
1994	11.71	35	0.9255	0.4485	39.04
1995	11.72	40	1.2908	0.45	31.21
1996	9.18	57	1.1293	0.3346	27.76
1997	6.65	56	1.0928	0.2715	27.81
1998	11.34	41	1.1317	0.2439	51.52
1999	7.71	35	1.2414	0.2447	31.09
2000	4.45	44	1.3038	0.2423	28.76
2001	2.45	45	1.5397	0.2787	15.55

Source:IMF;International Financial Statistics(IFS)-(Various issues) ,Bank of Tanzania;Economic and Operation Reports(various issues),S.Ramadhani(2000), Authors computation.

APPENDIX 2:**QUANTITY OF CASH AND FOOD CROPS PRODUCED IN TANZANIA**

YEAR	COTTON	COFFEE	TEA	TOBACCO	MAIZE	PADDY	WHEAT
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
1966	66797	33583	6800	7520	629377	109687	35099
1967	58111	29729	7158	7989	517885	125558	45446
1968	39337	35110	7923	7262	602762	138232	41124
1969	57388	35863	8777	11664	745598	183778	70676
1970	64429	32367	8492	11069	729696	193000	84368
1971	54029	33882	10457	11879	900210	170983	98285
1972	64910	38291	12706	14181	780896	189117	81481
1973	53147	40889	12658	13025	783854	227896	88776
1974	59471	33811	12974	18150	1332301	285837	83330
1975	47184	49622	13732	14193	1512986	373426	67314
1976	67623	35262	72979	19126	1648066	365723	61578
1977	52376	38222	88531	17137	1465008	387331	54690
1978	55768	33853	84292	17087	1000000	260000	38000
1979	56477	30850	83074	17234	900000	250000	30000
1980	57151	52301	78403	16675	800000	180000	90000
1981	44592	36090	78403	16264	1654000	320000	95000
1982	42902	38852	74563	13615	1651000	228000	59420
1983	43954	36436	84240	11012	1939000	231000	72420
1984	52012	36270	72936	13316	2093000	427000	66840
1985	47490	41042	77230	12549	2211000	547000	97900
1986	57446	39060	71472	16445	2359000	644000	71900
1987	67716	32804	64694	12921	2339000	615000	75240
1988	63432	41230	63632	11554	3128000	718000	81310
1989	37844	34945	71068	11808	2445000	710000	105850
1990	49221	31304	92876	16459	2331000	624000	83700
1991	90717	37065	83223	23322	2111000	670000	64000
1992	85784	36901	100630	23324	2226000	392000	77100
1993	50142	26361	102390	25797	2159000	614000	59000
1994	42695	27137	116249	22650	2567000	723500	75000
1995	84782	35142	93771	28598	2638000	733000	61000
1996	85187	32933	93771	35380	1831000	550800	78000
1997	69639	19789	120548	51095	2685000	810800	112000
1998	35480	23605	150800	37957	2452000	506000	82000
1999	33686	18171	105941	24434	2128000	476000	32000
2000	41415	37176	118735	26488	2240000	991700	67000
2001	49415	38000	111296	48000	3348000	1010000	65000
2002	62782	42005	81000	59000	3495000	1054000	68000

Source:Ministry of Planning: Economic Survey:Various issues,Ministry of Agriculture and Food Security:Basic Data,Crop Review(Various issues)

APPENDIX 3**:PRICES OF CASH AND FOOD CROPS IN TANZANIA(PRODUCER PRICES)**

YEAR	COTTON	COFFEE	TEA	TOBBACO	MAIZE	PADDY	WHEAT
	shs/kg	shs/kg	shs/kg	shs/kg	sh/kg	sh/kg	sh/kg
1966	0.92	6.12	0.03	4.61	0.4	0.45	0.45
1967	0.92	5.53	0.03	5.23	0.44	0.49	0.4
1968	0.96	5.21	0.1	5.16	0.44	0.5	0.5
1969	1	4.75	0.15	5.12	0.39	0.6	0.5
1970	1.1	7.08	0.26	5.12	0.26	0.6	0.57
1971	1.1	6.43	0.48	4.93	0.24	0.55	0.57
1972	1.13	6.75	0.5	5.8	0.26	0.56	0.57
1973	1.13	7.63	0.55	5.66	0.33	0.57	0.57
1974	1.5	9.61	0.55	6.5	0.5	0.65	0.57
1975	1.75	7.66	0.65	7.5	0.75	1	0.77
1976	2	15	0.9	8.21	0.8	1	1
1977	2.3	10.89	1.5	7.4	0.85	1.2	1.2
1978	5.34	9.07	1.5	7.4	0.85	1.2	1.25
1979	9.7	11.42	1.5	8.8	1	1.5	1.25
1980	10.75	12.36	1.5	10.5	1	1.75	1.35
1981	11.04	14.9	1.5	12.6	1.5	2.3	1.65
1982	14.02	15.17	1.5	18	1.75	3	2.2
1983	17.9	22.87	2.8	18	2.2	4	2.5
1984	25.01	29.68	2.8	25.2	4	6	3

1985	38.8	45.8	4.1	37.9	5.25	8	4.5
1986	50.41	50.75	4.9	49.25	6.3	9.6	6
1987	56.72	66	7.6	63	8.2	14.4	7.2
1988	66.72	90	9.9	75.6	9	17.3	9
1989	83.58	165	13.4	93.04	11	19	10.35
1990	122.39	165	17	117	13	26	13
1991	208.95	230	28	264.61	30	31.4	38.4
1992	179.1	316	45	313.95	51.67	74.22	79.67
1993	189	923	45	343.97	58.07	119.41	119
1994	307	1965	50	564.58	97	133.66	132.33
1995	350	1229.3	55	561	67.36	136.48	169.33
1996	327	1418.7	55	632	95.13	126.33	207
1997	373	1000	55	714	103.24	199	261
1998	301	1936	55	530	98.66	193	221.33
1999	264	1486.6	55	527	113.48	251.9	242
2000	322	600	65	527	103.57	266.5	262
2001	272	450	80	543.41	147.5	212	282

Source:Ministry of Planning: Economic Survey:Various issues,Ministry of Agriculture and Food Security:Basic Data,Crop Review(Various issues)

Appendix 4 : Data used in derivation of some of other variables

Year	GDP curr't price (Mill. Tshs)	Exports (f.o.b) Million Tshs	Imports (c.i.f) Million Tshs	Reserves in Million Tshs	External Debt service (million shillings)	GDP growth
1966	7042	1890	1695	409.12	42	11.1
1967	7343	1797	1638	411.98	48	4
1968	7874	1719	1834	523.36	46	5.2
1969	8271	1757	1710	541.93	32	1.8
1970	9174	1797	2274	401.27	45	5.8
1971	9,814	1,913	2,726	327.73	56	4.2
1972	11,172	2,313	2,883	748.27	66	6.7
1973	13,103	2,581	3,479	870.48	73	3.1
1974	15,994	2,878	5,377	343.67	72	2.5
1975	19,011	2,764	5,710	472.42	91	5.7
1976	24,419	3,683	5,350	891.63	98	6.6
1977	28,868	4,198	6,161	2,279.75	122	0.4
1978	32,169	3,669	8,798	708.55	173	2.1
1979	36,283	4,096	9,073	528.55	241	2.4
1980	42,118	4,192	10,308	166.05	233	3
1981	49,102	4,706	9,739	136.62	281	-0.8
1982	61,930	4,144	10,499	44.54	529	0.6
1983	68,520	4,138	8,877	215.00	872	-2.4

1984	85,390	4,388	9,653	409.77	1206	3.4
1985	112,210	4,265	14,959	279.52	2254	4.6
1986	148,390	11,285	30,577	1,814.85	6308	1.9
1987	329,430	18,512	59,340	2,037.04	14471	4.9
1988	506,430	27,041	80,828	7,714.83	23696	4.1
1989	633,750	51,463	146,705	7,771.20	25579	4
1990	830,690	64,571	265,984	37,607.57	31334	4.5
1991	1,086,210	74,708	338,990	44,686.72	42007	3.6
1992	1,369,870	123,966	449,480	93,361.86	49275	3.5
1993	1,725,540	181,147	615,990	76,839.19	61991	3.7
1994	2,298,870	265,177	765,757	161,807.5	103514	1.4
1995	3,020,500	390,378	968,910	146,736.2	121849	3.6
1996	3,767,640	455,519	804,949	246,839.5	126435	4.2
1997	4,708,630	459,549	818,703	372,475.0	127787	3.3
1998	5,571,640	391,805	967,080	388,699.0	201853.8	4
1999	6,432,910	412,204	1,161,841	567,134.7	128178.4	4.7
2000	7,225,690	531,058	1,219,385	769,274.1	152718.22	4.9
2001	8,186,480	681,186	1,502,636	1,002,263	105956.76	5.7

Source:IMF;International Financial Statistics(IFS)-(Various issues) ,Bank of Tanzania;Economic and Operation Reports(various issues),S.Ramadhani(2000)

Appendix 4 continues

Year	inflation	Government Consumption (mill.Tzs)	GDP_90	CPI_90	Parallel MKT exc. rate	Exchange rate Tshs/US$ (period average)
1966	2.8	725	391420	1.1	8.6	7.14
1967	2.2	803	401074	1.4	8.7	7.14
1968	3.5	884	421847	1.6	8.5	7.14
1969	2.1	995	429600	1.9	8.7	7.14
1970	3.4	1208	454515	2	10.1	7.14
1971	4.7	1365	473513	2.1	11.6	7.14
1972	7.6	1494	505352	2.2	15.4	7.14
1973	10.5	1968	520799	2.5	14.5	7.02
1974	19.2	2604	533819	2.9	13.5	7.13
1975	26.5	3259	564179	3.9	20.6	7.37
1976	6.5	3989	601464	4	21.9	8.38
1977	17.5	4308	603880	4.4	21.5	8.29
1978	6.6	5585	616742	4.7	13.1	7.71
1979	12.9	5956	631659	5.3	20	8.22
1980	30.3	5494	650548	6.9	25.7	8.18
1981	25.7	6105	647271	8.7	35.1	8.28
1982	28.9	8046	651104	11.2	43.4	9.28
1983	27.1	9443	635742	14.3	39.6	11.14

1984	36.1	13844	657132	19.4	60	15.29
1985	33.3	18555	687300	25.9	100.8	17.47
1986	32.4	23621	700300	34.3	167.5	32.7
1987	30	55600	734829	44.6	180	64.26
1988	31.2	84540	764663	58.5	210	99.29
1989	25.8	101410	795192	73.6	270	143.38
1990	19.7	147650	830693	100	330	195.06
1991	20.9	205730	878056	128.7	370	219.16
1992	21.9	269020	909029	156.8	435	297.71
1993	26.1	334520	946919	196.4	495	405.27
1994	33.1	393500	975642	126.4	526.11	509.63
1995	29.8	462320	1019546	339.3	595.05	574.76
1996	21	435330	1062367	406.1	608.25	579.98
1997	16.4	413560	1097425	471.4	631	612.12
1998	12.1	433790	1141322	578.4	665.5	664.67
1999	8.2	451140	1194964	625.8	746.08	744.76
2000	5.9	473690	1253517	662.7	807.73	800.41
2001	5.2	516330	1324967	697.2	877.32	876.4

Source:IMF;International Financial Statistics(IFS)-(Various issues) ,Bank of Tanzania;Economic and Operation Reports(various issues),S.Ramadhani(2000)

Appendix 5: Johansen Cointegration test

Ho:No. of EC(s)	Eigen Value	Likelihood Ratio	5% Critical Value	1% Critical Value
p==0*	0.67	77.99	68.52	76.07
p<=1	0.45	39.00	47.21	54.46
p<=2	0.26	18.35	29.68	35.65
p<=3	0.15	7.83	15.41	20.04
p<=4	0.05	1.95	3.76	6.65

*(**) denotes rejection of the hypothesis at 5 %(1%) significance level
L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Appendix 6: OVER-PARAMETERISED (GENERAL) EQUATION

Modelling DLrer by OLS

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DLrer _1	0.456655	0.2254	2.03	0.066	0.2549
Constant	0.0247737	0.03308	0.749	0.468	0.0446
DDLGCONS	-0.320677	0.2167	-1.48	0.165	0.1544
DDLGCONS_1	0.101767	0.1708	0.596	0.562	0.0287
DMP	-0.112427	0.3430	-0.328	0.749	0.0089
DMP _1	-0.566408	0.3696	-1.53	0.151	0.1637
DLRES	0.00236486	0.02907	0.0814	0.936	0.0006
DLRES _1	0.0649850	0.03852	1.69	0.117	0.1917
DDLdev	0.890960	0.2653	3.36	0.006	0.4844
DDLdev_1	0.204102	0.2720	0.750	0.467	0.0448
DLtot	0.399807	0.1672	2.39	0.034	0.3228
DLtot_1	-0.126041	0.1931	-0.653	0.526	0.0343
DLopen	0.604443	0.2170	2.78	0.016	0.3926
DLopen _1	0.140903	0.2435	0.579	0.574	0.0271
DLdebt	0.129530	0.07543	1.72	0.112	0.1973
DLdebt_1	-0.106137	0.09876	-1.07	0.304	0.0878
Dtekp	-0.00995014	0.01022	-0.973	0.350	0.0732
Dtekp _1	-0.0154113	0.009483	-1.63	0.130	0.1804

```
dm1                0.0505885    0.06857    0.738   0.475   0.0434
ect_1              -0.823551     0.2937    -2.80   0.016   0.3958

sigma              0.0875866  RSS              0.092056
R^2                 0.928381  F(19,12) =    8.187 [0.000]**
log-likelihood       48.2113  DW                     1.65
Results estimated using PC-Give 10
Ect is the error correction term
```

Appendix 7: PARSIMONIOUS (PREFFERED) EQUATION

```
Modelling DLrer by OLS


                Coefficient  Std.Error  t-value  t-prob Part.R^2
DLrer _1          0.625452     0.1040     6.02   0.000   0.6441
Constant          0.0295598    0.01950     1.52   0.145   0.1030
DDLGCONS          -0.176790     0.1394    -1.27   0.219   0.0744
DLRES   _1        0.0666557    0.02664     2.50   0.021   0.2384
DDLdev             0.832318     0.2037     4.09   0.001   0.4550
DLtot              0.408816     0.1137     3.60   0.002   0.3926
DLopen             0.610611     0.1301     4.69   0.000   0.5240
DLdebt             0.147013    0.06269     2.35   0.029   0.2157
DLdebt_1          -0.143650    0.06814    -2.11   0.048   0.1818
ect_1             -0.959498     0.1828    -5.25   0.000   0.5795
DMP  _1           -0.387942     0.2161    -1.80   0.088   0.1388
DLtot_1           -0.185206     0.1029    -1.80   0.087   0.1395

sigma              0.0822823  RSS              0.135407435
R^2                 0.894655  F(11,20) =    15.44 [0.000]**
log-likelihood       42.0372  DW                     1.6

AR 1-2 test:      F (2, 18) = 0.23321 [0.7943]
ARCH 1-1 test:    F (1, 18) = 0.25966 [0.6165]
```

```
Normality test:   Chi^2(2) =   0.46460 [0.7927]
hetero test:      Chi^2(22)=   19.670 [0.6037]
RESET test:       F (1, 19) =   1.0273 [0.3235]
Results estimated using PC-Give 10
```

Appendix 8: Unit Root Test

Variable	Value (ADF/DF)	Trend	Lag	Order of Integration
DEBT	-0.2595*	Yes	0	I(1)
ΔDEBT	-0.47499*	No	0	I(0)
DEV	-2.2464*	Yes	1	I(2)
ΔDEV	-1.9215*	No	1	I(1)
ΔΔDEV	-5.0261*	No	1	I(0)
GCONS	-1.5591*	Yes	1	I(2)
ΔGCONS	-2.6614*	No	1	I(1)
ΔΔGCONS	-7.5082*	No	1	I(0)
OPEN	-2.0857*	Yes	1	I(1)

ΔOPEN	-4.2559*	No	1	I(0)
RES	-1.8243*	Yes	0	I(1)
ΔRES	-7.5086*	No	0	I(0)
TOT	-2.285*	No	1	I(1)
ΔTOT	-5.5851*	No	1	I(0)
MP	-3.2458*	No	1	I(1)
ΔMP	-5.7312*	Yes	1	I(0)
TEKP	-2.9069*	Yes	1	I(1)
ΔTEKP	-5.7518*	Yes	1	I(0)

*(**) Significance at 1 %(5%) respectively
All variables are in log except TEKP and MP
ADF=Augmented Dickey Fuller, DF= Dickey Fuller

Appendix 9: Descriptive statistics

	LRER	LDEBT	LDEV	LGCONS	LOPEN	LRES	LTOT	MP	TEKP
Mean	4.102	2.512	3.723	1.096	-1.085	2.468	3.869	-3.336	3.667
Median	4.038	2.896	2.569	0.570	-1.004	2.683	3.807	-3.162	3.850
Maximum	4.856	4.473	6.776	3.814	-0.661	4.200	4.718	2.418	11.100
Minimum	3.270	0.599	1.949	-1.686	-1.805	-0.857	3.091	-11.186	-2.400
Std. Dev.	0.419	1.308	1.933	2.027	0.324	1.181	0.426	2.341	2.330
Skewness	0.005	-0.096	0.464	0.124	-0.633	-0.806	0.365	-0.587	0.213
Kurtosis	1.905	1.359	1.446	1.412	2.293	3.224	2.385	5.625	5.279
Jarque-Bera	1.798	4.097	4.912	3.876	3.155	3.973	1.368	12.405	8.061
Probability	0.407	0.129	0.086	0.144	0.206	0.137	0.505	0.002	0.018

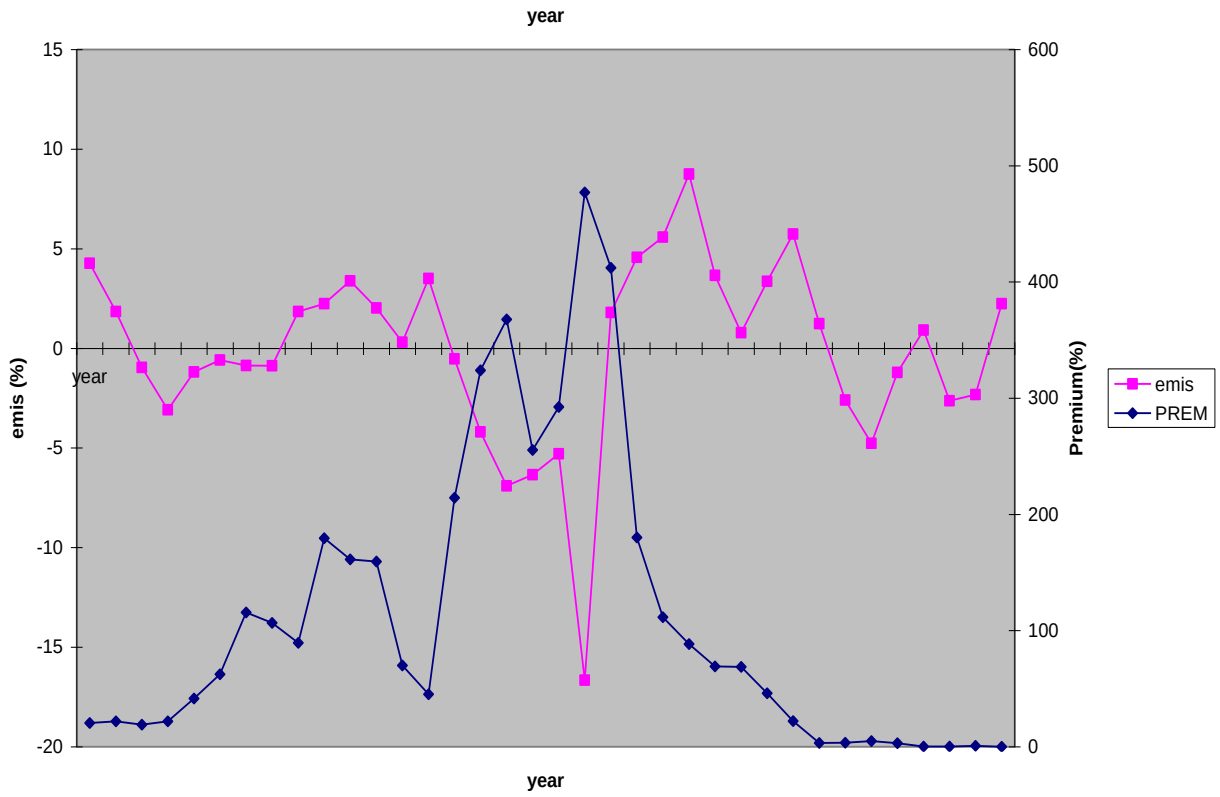
***All variables in log except TEKP and MP**

Appendix 10: *Granger Causality Tests (Sample 1966-2001)**

Null Hypothesis:	F-Statistic	Probability	Decision
LDEBT does not Cause LRER	5.03964	0.01323	Reject
LGCONS does not Cause LRER	3.79044	0.03448	Reject
LOPEN does not Cause LRER	2.96841	0.06717	Reject
LRES does not Cause LRER	0.1947	0.82415	Do not Reject
LTOT does not Cause LRER	2.708	0.08351	Reject
TEKP does not Cause LRER	0.35755	0.70243	Do not Reject
DM1 does not Cause LRER	3.91027	0.03137	Reject

All variables in log except TEKP and MP
*Calculated using E-Views

Appendix 11:Real Exchangec Rate Misalignment(1966 to 2001)



Appendix 12(a) EXPORT TRADE SHARE

EXPORT TRADE SHARE (%)

YEAR	UK	US	JAPAN	ITALY	FRANCE	GERMAN	INDIA	N'LANDS	BELGIUM	KENYA	TOTAL
1967	28.36412	5.876709	4.01775	2.158791	0.83953	5.936675	6.476373	2.818422	2.33869	4.077716	62.90477
1970	20.03348	8.693774	5.183865	2.429937	1.079972	4.697878	6.587829	3.239916	1.889951	6.425833	60.26243
1975	12.66281	6.041968	1.591896	3.617945	0.65123	8.646889	5.412446	3.733719	3.125904	6.110709	51.59551
1980	19.9666	4.031489	5.104962	5.629771	0.572519	14.98092	1.717557	5.462786	0.978053	0.214695	58.65935
1985	22.3306	2.536928	4.611958	5.460727	1.772567	28.09613	4.710434	8.133646	3.134818	1.12544	81.91325
1990	12.88752	8.255647	4.717513	3.509589	0.920967	15.09003	0.203123	6.539915	2.043254	3.557666	57.72523
1995	21.34864	3.533575	9.570083	1.766775	1.914017	10.61986	0.854608	6.036508	1.472317	1.766775	58.88316
2000	22.26361	2.31262	5.185954	1.362743	5.505523	10.02966	1.493273	6.930565	2.788544	4.890562	62.76306
2001	18.07008	1.948892	8.818562	1.006054	17.52063	4.924801	10.57669	6.653523	1.360084	4.902281	75.7816
2002	17.88838	1.494778	10.64855	2.702919	16.83858	3.051003	7.103998	5.965508	2.347501	3.895375	71.93659

ADJUSTED EXPORT TRADE SHARE

YEAR	UK	US	JAPAN	ITALY	FRANCE	GERMAN	INDIA	N'LANDS	BELGIUM	KENYA	TOTAL
1967	0.450906	0.093422	0.06387	0.034318	0.013346	0.094376	0.102955	0.044805	0.037178	0.064824	1
1970	0.332437	0.144265	0.086022	0.040323	0.017921	0.077957	0.109319	0.053763	0.031362	0.106631	1
1975	0.245425	0.117103	0.030853	0.070121	0.012622	0.16759	0.104901	0.072365	0.060585	0.118435	1
1980	0.340382	0.068727	0.087027	0.095974	0.00976	0.255388	0.02928	0.093127	0.016673	0.00366	1
1985	0.272613	0.030971	0.056303	0.066665	0.02164	0.342999	0.057505	0.099296	0.03827	0.013739	1
1990	0.223256	0.143016	0.081724	0.060798	0.015954	0.261411	0.003519	0.113294	0.035396	0.061631	1
1995	0.362559	0.06001	0.162527	0.030005	0.032505	0.180355	0.014514	0.102517	0.025004	0.030005	1
2000	0.354725	0.036847	0.082627	0.021713	0.087719	0.159802	0.023792	0.110424	0.04443	0.077921	1
2001	0.238449	0.025717	0.116368	0.013276	0.231199	0.064987	0.139568	0.087799	0.017947	0.06469	1
2002	0.248669	0.020779	0.148027	0.037574	0.234075	0.042412	0.098754	0.082927	0.032633	0.05415	1

Source: Authors Computation

Appendix 12(b):IMPORT TRADE SHARE

IMPORT SHARE (%)

YEAR	UK	US	JAPAN	ITALY	GERMAN	FRANCE	INDIA	N'LANDS	BELGIUM	KENYA	TOTAL
1967	23.50769	6.153846	4.246154	3.876923	6.461538	2.092308	2.646154	2.892308	0.676923	14.21538	66.76923
1970	18.07229	4.617008	6.287925	4.792894	8.354586	2.814176	2.418433	3.649635	1.099288	12.97159	65.07783
1975	13.78284	12.3993	6.217163	3.467601	7.65324	1.471103	2.161121	2.845884	1.833625	2.154116	53.98599
1980	17.31665	6.005045	8.556461	4.860303	10.54521	2.299185	2.813349	6.228172	3.094684	0.776096	62.49515
1985	12.34842	4.414734	9.997995	9.167725	9.76937	0.967311	1.483388	4.289725	3.206765	2.383849	58.02928
1990	14.7456	1.345541	6.669765	5.789889	8.672943	3.699372	1.485629	3.769849	2.770638	1.527569	50.4768
1995	10.81249	4.921555	8.053453	4.175868	3.952159	1.193105	5.294399	2.460771	2.908189	10.21595	53.98795
2000	7.791193	4.309037	10.40484	2.605139	3.810816	1.863756	6.492672	2.160462	1.060559	6.828678	47.32715
2001	7.080753	4.180568	9.646546	3.247496	4.359629	2.660093	5.599243	1.977528	1.410597	6.150252	46.3127
2002	6.271982	6.045465	9.17561	2.973124	3.96964	2.575986	7.068429	1.811224	1.533528	6.17959	47.60458

ADJUSTED IMPORT SHARE

YEAR	UK	US	JAPAN	ITALY	GERMAN	FRANCE	INDIA	N'LANDS	BELGIUM	KENYA	TOTAL
1967	0.352074	0.092166	0.063594	0.058065	0.096774	0.031336	0.039631	0.043318	0.010138	0.212903	1
1970	0.277703	0.070946	0.096622	0.073649	0.128378	0.043243	0.037162	0.056081	0.016892	0.199324	1
1975	0.255304	0.229676	0.115163	0.064231	0.141763	0.02725	0.040031	0.052715	0.033965	0.039901	1
1980	0.277088	0.096088	0.136914	0.077771	0.168736	0.03679	0.045017	0.099658	0.049519	0.012419	1
1985	0.212796	0.076078	0.172292	0.157984	0.168352	0.016669	0.025563	0.073923	0.055261	0.04108	1
1990	0.292126	0.026657	0.132135	0.114704	0.17182	0.073289	0.029432	0.074685	0.054889	0.030263	1
1995	0.200276	0.09116	0.149171	0.077348	0.073204	0.022099	0.098066	0.04558	0.053867	0.189227	1
2000	0.164624	0.091048	0.219849	0.055045	0.080521	0.03938	0.137187	0.04565	0.022409	0.144287	1
2001	0.15289	0.090268	0.208292	0.070121	0.094135	0.057438	0.120901	0.042699	0.030458	0.132798	1
2002	0.131752	0.126993	0.192746	0.062455	0.083388	0.054112	0.148482	0.038047	0.032214	0.129811	1

Source: Authors' Computations

Appendix 12(c): EXCHANGE RATE OF TANZANIAN SHILLING AGAINST HER MAJOR TRADING PARTNERS.

YEAR	US	UK	FRANCE	GERMAN	JAPAN	ITALY	KENYA	INDIA	N'LANDS	BELGIUM
	Tsh/usd	Tshs/Pound	Tshs/Ffranc	Tshs/DM	Tshs/Yen	Lire	Tsh/Kshs	Tsh/Rupe	sh/du.guilder	sh/Bfranc
1967	7.177	17.227	1.461	1.7969	0.0198	0.0115	0.9996	0.952	1.9942	0.1445
1970	7.16	17.22	1.299	1.97	0.019	0.0115	0.9996	0.952	1.994	0.1443
1975	8.29	16.79	1.86	3.17	0.025	0.0121	1.0037	0.8799	3.0932	0.2102
1980	8.22	19.65	1.82	4.19	0.038	0.0089	1.1051	1.0429	3.8559	0.2615
1985	16.49	23.59	2.15	6.59	0.073	0.0097	1.0632	1.4124	5.8529	0.3227
1990	195.07	379.29	38.78	131.64	1.35	0.1735	8.5123	11.1437	116.684	6.3728
1995	550.36	859.83	112.55	387.69	5.48	0.3504	11.1756	17.7247	346.2386	18.861
2000	803.26	1194.53	114.17	382.91	7.04	0.3868	10.5074	17.8098	339.8452	18.5651
2001	916.3	1330.19	123.79	415.19	6.98	0.4194	11.0322	18.5991	368.4567	20.1296
2002	965.72	1457.993	129.464	434.2	7.7785	0.4386	12.3541	19.2631	385.3651	21.0517

Sources: Bank of Tanzania Economic and operation reports (various issues): For India, Japan and Kenya: Cross rates against USD based on IMF (2002) Financial Statistics Yearbook 2002

APPENDIX 12(d)

EXPORTS SHARE (MILLION SHS)

	UK	US	JAPAN	ITALY	FRANCE	GERMAN	INDIA	N'LANDS	BELGIUM	KENYA
1967	473	98	67	36	14	99	108	47	39	68
1970	371	161	96	45	20	87	122	60	35	119
1975	350	167	44	100	18	239	149.6	103.2	86.4	168.9
1980	837	169	214	236	24	628	72	229	41	9
1985	952.4	108.2	196.7	232.9	75.6	1198.3	200.9	346.9	133.7	48
1990	8578	5495	3140	2336	613	10044	135.2	4353	1360	2368
1995	83340.4	13794.3	37359.5	6897.1	7471.9	41457.6	3336.2	23565.2	5747.6	6897.1
2000	117501.5	12205.4	27370.1	7192.2	29056.7	52933.9	7881.1	36577.7	14717.2	25811.1
2001	123085.5	13275	60068.2	6852.8	119342.9	33545.6	72043.8	45320.9	9264.3	33392.2
2002	156356.9	13065.4	93075.8	23625.4	147180.9	26667.9	62093.9	52142.7	20518.8	34048.3

IMPORTS SHARE (MILLION OF SHILLINGS)

	UK	US	JAPAN	ITALY	GERMAN	FRANCE	INDIA	N'LANDS	BELGIUM	KENYA
1967	382	100	69	63	105	34	43	47	11	231
1970	411	105	143	109	190	64	55	83	25	295
1975	787	708	355	198	437	84	123.4	162.5	104.7	123
1980	1785	619	882	501	1087	237	290	642	319	80
1985	1847.2	660.4	1495.6	1371.4	1461.4	144.7	221.9	641.7	479.7	356.6
1990	34104	3112	15426	13391	20059	8556	3436	8719	6408	3533
1995	83340.4	37934.3	62074.3	32186.7	30462.4	9196.2	40808.1	18967.1	22415.7	78742.4
2000	85267.9	47158.7	113872	28511	41706.1	20397.2	71056.7	23644.4	11606.9	74734
2001	96945.7	57238	132075.1	44462.9	59689.6	36420.5	76661.7	27075.2	19313.1	84205.8
2002	91630.6	88321.3	134051.2	43435.9	57994.5	37633.9	103266	26461.1	22404.1	90280.8

Source: Bank of Tanzania Economic and operation reports (various issues), TRA; Custom Department-Trade Reports (various issues)