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ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

THE BEHAVIORS AND DYNAMICS OF THE
REAL EXCHANGE RATES OF THE "BIRR"

(1960 - 1991)

by

Andualem Berhanu

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

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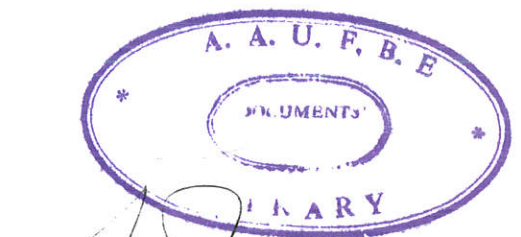
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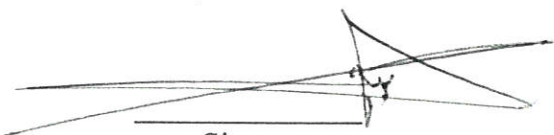
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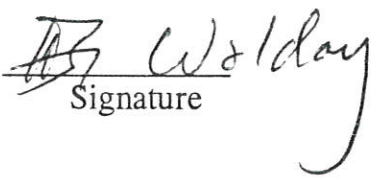



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EXCHANGE RATES OF THE "BIRR"

(1960 - 1991)

A paper presented
In partial fulfillment of the
Requirements for the Degree of
Master of Science in Economic
Planning and Policy Analysis

By

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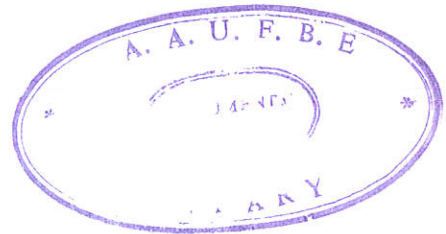
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CHAPTER ONE

I N T R O D U C T I O N

Problems of exchange rate have become the dominant themes in policy discussions in the developing countries. Two main issues regarding these have attracted the attention of policy makers and academics. First, there has been an increased interest in understanding why the real exchange rate moves; and Second, there has been mounting concern regarding the effectiveness of nominal devaluation as a policy tool. The first of these is what is going to be dealt with in this paper for Ethiopia for the period 1960 up to 1991.

It is very important to know that there is no "one single" real exchange rate but several real exchange rates. The proposition "the" can only be attached to real exchange rate to express real exchange rate as defined by the analyst concerned. Therefore, there is no "the" real exchange rate for Ethiopia in this study. Rather, there are four real exchange rate indexes constructed and their behaviors explained. There will be misunderstanding if one is not aware of which real exchange rate one is talking or reading about.

The rest of this thesis is structured as follows. In the remaining sections of this introductory chapter the research problem is formally stated; significances, objectives, and methodologies (both of data collection and analyses) of the study are presented. In chapter two the definitions of the

various technical terms and concepts included in the study and the measurement problems faced in the process of collecting data are presented. Chapter three reviews the major relevant literature on the real exchange rate. Chapters four and five are the heart of this study; the former deals with the behavior and dynamics of the real exchange rate [RER] of the 'Birr' whereas the latter deals with some of the structural characteristics of the Ethiopian economy and the significance for RER movements. In the last chapter, the summary, conclusions derived, and some sensible policy recommendations, are presented.

1.1 Statement of the problem

The behavior and dynamics of "the" real exchange rate has become a subject of discussion in modern days in the formulation of macroeconomic policies, especially in developing countries. [For example see 4, 11, 13, 17 and 18]. Since the real exchange rate is usually taken in the literature as a good proxy for the measure of degree of international competitiveness, when macroeconomic policies are formulated they are evaluated, besides other things, as to how they do affect this important price. For instance, a common policy instrument in the orthodox structural adjustment programs that have been undertaken in many developing countries (those assisted by the International Monetary Fund and the World Bank) is currency devaluation, which is done with the intention of bringing about real devaluation. Real



devaluation is often deemed necessary to bring about improvement in the external sector's performance of a country, *ceteris paribus*, by improving competitiveness of exports, by shifting resources from sectors producing non-tradables to those producing tradables, and by making imports more expensive.

The common incorporation of currency devaluation in the orthodox Structural Adjustment Programs [SAPs] implicitly means that there is a disequilibrium in the real exchange rates of those countries in which the SAPs are taking place. The nominal devaluation is thus meant to equilibrate the real exchange rate. This is in fact what has been recommended by the Prime Minister's Office of the Transitional Government of Ethiopia [TGE] in September 1992 and a move began towards devaluation of the Ethiopian currency [The Birr]. Policy makers, therefore, must know whether there is a real exchange rate disequilibrium.

What policy makers must know is not only whether the real exchange rate is in disequilibrium. They must know the extent of the disequilibrium, the factors that gave rise to such a disequilibrium, and how they can be combatted. In the literature, measuring the extent of disequilibrium in the real exchange rate has been challenging. In spite of its difficulty, the most important theoretical aspects of it have been dealt with by various economists. In this respect, Edwards S.'s various works [16, 17, 18 and 19] are the basic

references for the paper in dealing with these questions in Ethiopia.

The research problem properly stated is, thus, the following: What has been the dynamics and the behavior of 'the' real exchange rate of the 'Birr' over the period 1960 up to 1991? That is, what has been its time path, its equilibrium or disequilibrium levels, how would those disequilibriums (if there were) have been tackled, and what can one predict into the future about these issues?. Given data and intellectual constraints, this thesis gives some basic highlights on these issues.

1.2 Significance of the study

The significance of this study is at least in two respects. First, it helps economic policy makers and any interested individuals know about the characteristics of the real exchange rate of the 'Birr', which so far has not been looked into by Ethiopian (or otherwise) economists. While this is relegated to a point of neglect, nominal devaluation has already been set in motion as a part and parcel of the policy packages in the economic reform program that has been taking place. This study, therefore, gives us a clue as to where we are going.

Second, and most important, it brings out the basic determinants of the real exchange rate of the 'Birr' and shows

how these factors affect the equilibrium. This is very important for understanding the efficacy of the nominal devaluation. All the factors which affect the actual and the equilibrium real exchange rates must also be dealt with proper policy instruments. Otherwise, the nominal devaluation may come out to be an action in futile.

1.3 Objectives of the study

To this paper's knowledge, no systematic analysis has been done on the real exchange rate of the 'Birr' in Ethiopia over the period 1960 to 1991. But, it is a very important price which is worth studied. The general objective is, thus, to study the dynamics and the behavior of this price. In specific terms, the objectives of this study are the following:

- (i) to trace the path and identify the implications of the real exchange rate movements of the 'Birr' over the period 1960 to 1991;
- (ii) to determine the equilibrium real exchange rate of the 'Birr' and trace its path and identify its implications;
- (iii) to identify the fundamental determinants of the real exchange rate of the 'Birr' over the same period; and

(iv) based on the three specific objectives stated above, to highlight on the possible impacts of the currently going on economic reforms on the real exchange rate of the 'Birr'.

1.4 Methodology

1.4.1 Methodology of Data Collection

As far as data collection is concerned, secondary published and unpublished sources are used. Because the period covered is fairly long, that is, from 1960 to 1991 (31 years), there were problems of getting the series of a single variable from a single source. The attempt of getting complete information from various sources as a solution created some inconsistencies. However, the raw data obtained directly from various publications and with such inconsistencies were mostly some of those to be used in the calculation of the various real exchange rate indexes. Thus, they were to be combined with other consistently measured variables to give the relevant real exchange rate indexes and the problem of distortion tended to decline.

In cases where there were no informations available, the existing series were extrapolated forwards or backwards as the case might be. Such cases are indicated as footnotes to the relevant tables or appendices. In cases where rates of changes of some variables between two adjacent years were

considered, the rate of change for the beginning year of the series was assumed to have been equal to the average rate of change over the sample period.

1.4.2 Methodology of Analysis

In analyzing the data a combination of statistical and econometric techniques are used. Specifically, extrapolating data, time series analyses like searching for trend coefficients, coefficients of variations, checking for the stationarity of order one after testing for unit roots are used in the statistical part. On the econometrics part, because most of the variables, both the dependent and the explanatory ones, were proved to be integrated of order one, co-integration equations and the Error Correction counterparts are specified. Notice that the dependent variables are the various real exchange rate indexes and the explanatory ones are the so-called real exchange rate fundamentals. Besides these two, simple descriptive techniques like means are also used.

Based on the econometric techniques both the long-run equilibrium parameters and the parameters associated with the short-run dynamic adjustment processes are estimated. The long-run equilibrium parameters are those obtained from regressing the various real exchange rate indexes on the so-called real exchange rate fundamentals. Whereas, the parameters obtained from estimating the Error Correction

Specifications give rise to the parameters associated with the short-run dynamic adjustment mechanism.

1.4.3 Stationarity, Co-integration, and Error Correction.

(a) Stationarity

Before postulating a co-integration relationship between various time series variables a stationarity test must be undertaken upon those variables. In time series analysis stationarity is said to exist if the mean and the variance of the series are independent of time and the auto-covariance is a function not of time but of the time difference between the two points of time. To see what this means let us say that $y_t = \text{REER2I}_t$, $Z_t = \text{REER1I}_t$, $\text{TOT}_t = \text{Terms of Trade}$, and $\text{EXCRE}_t = \text{Excess supply for credits}$.

y_t is said to be stationary if $1/T \sum y_t = \bar{y}$, $\text{Var}(y_t) = \delta^2$ and $\text{Cov}(y_t, y_{t-1}) = \delta_{y_t, y_{t-1}}^1$. It is said to be non-stationary if either of the above conditions fail. This is a common criteria for all of the three variables. If y_t , for example, is proved to be non-stationary and will be stationary if it is differenced once then $y_t \sim I(1)$, which means that y_t is integrated of order 1. This can be tested using unit root tests.

There are various ways of testing for unit roots. The essence of testing for unit roots is as follows. Consider the following equation;

$$\Delta Y_t = c_1 + c_2 T + \rho Y_{t-1} + \beta_1 (Y_t - Y_{t-1})_{-1} + \epsilon_t \dots (1.1)$$

Where T = time and c_1 and c_2 are intercept and coefficient of T respectively, and $(Y_t - Y_{t-1})_{-1}$ is the difference lagged by 1. The most commonly used tests are the so-called Dickey - Fuller and Augmented Dickey Fuller (DF and ADF respectively) tests. What is needed to be tested is whether $\rho = 0$, which is the null hypothesis for the existence of unit roots, against $\rho < 0$, which is the alternate hypothesis of the non-existence of unit roots. If the calculated DF or ADF(1) is less than the tabulated critical value at different levels of significance, accept the null (see Appendix V). Such a test must be done on all the variables before going to any estimation or hypothesis testing. If, for example, a theory postulates that the long run equilibrium relationship is like:

$$Y_t = \text{constant} + \alpha_1 \text{TOT}_t + \alpha_2 \text{EXCRE}_t + \epsilon_t \dots (1.2)$$

or

$$Z_t = \text{constant} + \beta_1 \text{TOT}_t + \beta_2 \text{EXCRE}_t + V_t \dots (1.3)$$

Where ϵ_t and V_t exhibit white noise processes, then one must check for the stationarity of the variables and if they are not, of what order they are integrated. If they are not integrated of the same order, then the equilibrium relationship is not sensible. If they are integrated of the

same order, again, one must check whether their linear combination is integrated of an order less than that order for the individual series. If that is not true, then again the postulated equilibrium relationship does not make sense. Such tests are done for the six real exchange rate fundamentals and the two real effective exchange rates [see appendix V and the text].

(b) Co-integration.

For two or more time series variables to be co-integrated of order, say $[a,b]$, the variables must be stationary of the same order a , and a certain linear combination of them must be integrated of order b which is less than a . Equations 1.2 and 1.3 are valid co-integration relationships, for example, if the various series pass the test of existence of unit roots and if ϵ_t and V_t exhibit white noise processes.

Such co-integration relationships were observed between the six real exchange rate fundamentals considered in this study, on the one hand, and the two effective and the two bilateral real exchange rate indexes (each at a time), on the other—that is, four co-integration relationships as a whole.

(c) Error Correction

From the literatures on co-integration and time series analyses, it can be observed that any co-integrating

specification has got its error correction counterpart specification [see 45, p.13]. The intuition that lies behind this error correction specification is the removal of non-stationarity from the individual series so that the conventional classical regression techniques are applicable and correcting the equilibrium error created in the previous year. The coefficients obtained from the estimation of such an error correction model are indicators of the short-run dynamic adjustment processes.

Error correction specifications for the two multilateral and for the two bilateral real exchange rate indexes of the 'Birr' are estimated in this study.

1.5 Limitations

Though the significance of this study is not to be questioned, there are two severe limitations:

- (1) The construction of the various real exchange rate indexes of the 'Birr' is based on the retail price index of Addis Ababa, the commodity compositions of which are those taken some three decades ago and thus do not reflect the current state of consumer prices. This means that the real exchange rate indexes also do not exactly reflect the current state of real exchange rates.

- (2) Though the paper has tried to go into searching for the real causes of the variability in the real exchange rate, the actual variability in the real exchange rate is not captured because of no inclusion of the parallel market nominal exchange rate of the 'Birr' in the construction of the real exchange rate. It is the official exchange rate of the 'Birr' against the US dollar that is used in constructing the real exchange rate and this does not reflect the reality.

CHAPTER TWO

MEASUREMENT AND DEFINITIONS

2.1 Definitions

In the theoretical literatures one can find diverse ways of defining the RER. Even if there are such diversities in definition, Asmerom Kidane [3, P.2] stated, following the footsteps of Balassa B., that there are basically two approaches. He called them the 'traditional' (or the purchasing power parity (PPP)) approach and the 'modern' (the relative price of tradable to non-tradable) approach. In either case, a RER is a relative price.

2.1.1 The 'Traditional' (PPP) definition

According to Balassa B. [5], the PPP as a theory of exchange rate means different things to different people. But, as a definition of the RER, it is the relative rate of inflation between the domestic economy and the world; specifically, it is the ratio of consumer price index of the domestic economy to that of the world. Edwards S. [18] formally stated this as " $e_{ppp} = EP^* / P^2$ "; where e_{ppp} is the PPP real exchange rate, E stands for the nominal exchange rate measured as the price of foreign currency in terms of domestic currency (that is, the amount of domestic currency paid for one unit of foreign currency), P^* represents the foreign consumer price index, and P is the domestic consumer price

index. More about this theory of the real exchange rate is discussed in section 3.1.1.

2.1.2 The 'Modern' (relative price of tradable to non-tradable) definition

This 'Modern' definition of the real exchange rate is taken in most empirical literatures as a good proxy for the degree of international competitiveness.³ It is defined as the multiple of the ratio of the world price index of tradable goods to the domestic price index of non-tradables and the nominal exchange rate measured as the number of units of domestic currency paid for one unit of the foreign currency. Since tradable goods are classified into exportables and importables and because the objectives of analysts differ, the definition of the RER as the relative price of tradables to non-tradables has been treated in different ways. Edwards S. (18) stated four such ways:

- i) the dependent economy definition of the relative price of tradables to non-tradables, excluding taxes on trade;
- ii) the domestic relative price of tradables to non-tradables;
- iii) the domestic relative price of importables to non-tradables;and

- iv) the domestic relative price of exportables to non-tradables.

Another version of this modern definition can be that of Elbadawi I. [20]. He defined the real exchange rate as E_o/P_n , where E_o is the official exchange rate measured as the price of foreign currency in terms of domestic currency and P_n is the price of non-tradables. He defined the RER as such because his intention was to look at the impact of the RER on the performance of the agricultural sector. The literature on the behavior and dynamics of this 'modern' definition of the RER is reviewed (though partially) in section 3.1.2.

2.1.3 The Real Effective Exchange Rate

The bilateral real exchange rate of a country can hardly be taken as a measure of the level of competitiveness of a country in the international market. This is because, there are as many bilateral real exchange rates of a country as there are countries in the world with 'established' economies (established, here means that the countries are having a government with a functioning economy (having legal currency) at a certain standard). Therefore, a single measure of international competitiveness is required. The following expression is what is used to measure it.

$$REER_i = \sum w_{ij} e_{ij} P_{jt}^* / P_{it} \quad \dots \dots (2.1)^4$$

where,

$REER_{it}$ = the real effective exchange rate of country i at time t

w_{ij} = the weight attached to trade partner j of country i (the domestic).

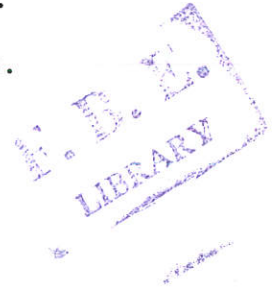
e_{ij} = the nominal exchange rate of the currency of country i against that of j (that is the amount of country i 's currency paid for one unit of the currency of country j).

P_{jt}^* = the price index of country j at time t .

P_{it} = the price index of country i at time t .

2.1.4 The Equilibrium RER

There are two ways of defining the equilibrium RER so far.⁵ First, a certain year, in which the economy is perceived to be in equilibrium (that is, both internal and external), is chosen and the RER along the line of the PPP is calculated and that rate is dubbed for some years to come as the equilibrium RER. There are problems associated with this definition [see, for example, 13]. Second, Edwards S. formally defined it as "... the relative price of tradables to non-tradables that, for given values of other variables, such as world prices, technology, and tariffs, equilibrates simultaneously the external and internal (that is, non-tradable) sectors."⁶ This equilibration was not only for the current period but also for the future. This definition of the equilibrium RER is, thus, an inter-temporal concept.



2.1.5 Misalignment of the RER

The standard definition of misalignment of the RER is a divergence of the actual RER from its equilibrium level.⁷

2.2 Measurement

In this section, the measurement problems faced in the process of collecting data and calculating the relevant variables included in the study are presented. One such variable is the Real Exchange Rate, which is the pivot variable in the paper. As is presented in section 2.1, there are various ways of defining the real exchange rate for analytical purposes. When we come to practice, however, measuring the practical counterparts would become difficult. This section, then, focuses on this pivot variable, the Real Exchange Rate.

The two broad ways of defining the real exchange rate are the traditional purchasing power parity definition and the Balassa (or Salter-Swan) approach. In the former case, the analytical concept about price levels refers to the ratio of price levels between the foreign and domestic economies. These price levels can be different things: Implicit GDP deflators, Whole Sale price indexes, Consumer Price Indexes, or unit labour costs. By which of these price level indicators should one measure that ratio?

In practice, there is no hard and fast rule as to which prices to make use of. But, from many empirical works, it is observed that the CPI's are the most recurrently used measures of price levels for this purpose. The arguments in favour of doing this are the following: the quarterly data on price indexes are available for many countries for an extended period of time and thus cross-country comparison is easily possible; and these price levels are most likely made up of similar group of goods in different countries and include large number of goods and thus cross-country comparison is more sensible.

However, the CPI is not without limitation. It includes large number of non-traded goods and thus the real exchange rate computed based on the CPI tends to distort the level of competitiveness in the international market. The GDP deflators, whole sale price indexes and unit labour costs are, thus, alternative prices. But, there are problems of using them. First, GDP deflators, though may be genuine price indexes of aggregate production they are available for many developing countries only on a yearly basis and include many non-traded goods giving rise to distortion in measuring the level of competitiveness in the international market as the using of CPI's does. Using WPI's, it is argued, can solve the problem of distortion that is to be created if the CPI were used.

The problem of using the WPI is that the WPI contains highly homogeneous tradable goods and these indexes tend to be equalized across countries when interpreted in similar currencies. These would mean that the real exchange rates computed using these indexes would not vary enough to measure the actual changes in competitiveness.

Finally, using unit labour costs also have serious drawbacks for the purpose of measuring difference in competitiveness among countries. First, labour is only one factor of production and thus it makes the real exchange rate a biased measure of competitiveness against variations in capital-labour ratio. Second, labour costs are not available for many developing countries on a time series basis and cross-country comparison would not be possible.

There were few problems associated with the measurement of the nominal exchange rates of the Ethiopian 'Birr' against its trade partners' reported in Appendix I. For almost all of the cases the annual average market rates (that is, rows r_h or r_f of the International Financial Statistics (IFS) of the International Monetary Fund (IMF)) are used. Exceptions are China, India, Finland, Kuwait, Sweden and Saudi Arabia. For China, India and Finland the annual average selling rates are used for the years 1960 through 1969 and not the annual average market rates. For the years 1974 through 1991, the annual average principal rate is used for China. For Kuwait,

Sweden and Saudi Arabia also the annual average official rates are used and not the annual average market rates.

Though the distinctions among market rates, selling rates, principal rates, and official rates are not clearly indicated in those publications from which the data are collected, these names clearly portray various concepts and thus this paper found it necessary to report it here.

The CPI's presented in Appendix II are also collected from various sources. This is because the period covered is so long that a single source that has got a complete information is not available. The three sources used for this purpose were as stated under Appendix II and there were some inconsistencies observed between the data of the two international publications. It should also be noticed that the base periods used were 1963 and 1985 for period 1 and period 2 respectively.

The whole sale price indexes reported in Appendix III also have got some problems. Because Whole Sale Price indexes are not available for some of the trade partners and, in some cases, for some of the years, prices like prices of import-type goods (Finland, 1960-69), cost of living indexes (Israel, 1960-62), indexes of share prices (Sweden and Switzerland, 1960-91), and industrial production, selling and/or share prices (Yugoslavia, 1960-73; Belgium, 1974-91; China 1980-88; Israel and Canada, 1974-91) were used instead of WPI as

proxies for prices of tradables. Notice also that there were slight inconsistencies between the two sources on the indexes of Greece, India, Sweden, and Switzerland for the years 1960 to 1973.

The Real Effective Exchange Rates were calculated based on trade shares of 'major' trading partners of Ethiopia as weights. In choosing the trade partners the major criteria was whether all the needed informations were available for these countries or not. Given this restriction, the Seventeen Countries considered in period I [1960-1973] accounted for 86.1 percent of Ethiopian total trade and the Sixteen countries considered in period II [1974-1991] accounted for only 70.2 percent.

CHAPTER THREE

REVIEW OF THE LITERATURE

In this chapter the theoretical and empirical literatures on issues directly related to the real exchange rate to-date are surveyed. Since the literature on this issue is bulging, this review is necessarily selective.

3.1 The theoretical literature on the real exchange rate

The theoretical literature on the behavior and dynamics of the RER is plenty.⁸ The fundamental theoretical aspects of this dynamics and behavior of the RER are selectively surveyed in the following sections.

3.1.1 The PPP theory of the RER

What is the PPP? Quoting G.Cassel, Balassa B. [5] stated that "... the rate of exchange between two countries will be determined by the quotient between the general levels of prices in the two countries (and) at every moment the real parity between two countries is represented by (the) quotient between the purchasing power of money in one country and the other. I propose to call this parity "the purchasing power parity."⁹ This statement implies that there is a direct link between the exchange rates of currencies and the corresponding general levels of prices in the respective countries. In fact Barro R.J [6] noted that the ratio of the

exchange rates between two currencies is equal to the corresponding price ratios under the PPP theory.

If E_w and E_x are reciprocal bilateral nominal exchange rates of currencies of countries w and x respectively and P_w and P_x are the respective general price levels, then $E_w/E_x = P_w/P_x$. This is what Balassa B. called the absolute version of the theory of the purchasing power parity. This result is dependent upon one very restrictive assumption that all goods are tradable and physically identical between the two countries.

Balassa B. [5], in his article on the doctrine of the PPP, identified two interpretations of the doctrine. He called them the 'absolute' and the 'relative' versions." According to the first version.", he noted, "purchasing power parities calculated as a ratio of consumer goods prices for any pair of countries would tend to approximate the equilibrium rate of exchange. And, the relative interpretation of the doctrine asserts that, in comparison to a period when equilibrium rates prevailed, changes in relative prices would indicate the necessary adjustment in exchange rates."¹⁰ The question arises here as to what is exactly meant by the equilibrium exchange rate. Though it is not explicitly stated in the earlier works on this theory of the PPP, Edwards S. recently has formally defined it [see section 2.1.4]

It is stated at the beginning of section 2.1 that a real exchange rate is a relative price. Specifically, the PPP real exchange rate is the relative price between the domestic economy and the world; where the world can be a single country or a group of countries merged together. The PPP real exchange rate as a measure of such a relative price has got both theoretical and empirical drawbacks [see, for example, [5], pp 192-209; [6], p. 398; and [13], pp 45-46]. First, it is not theoretically feasible to assume that goods are physically identical. The absolute version of the PPP need not exactly hold if we remove this assumption.

Let us consider, for example, that there are two kinds of goods- tradables and non-tradables; and countries specialize in the production of different tradables. The relative price of these tradables can change in the different countries and thus the PPP condition fails. The prices of non-tradables are also determined in the various countries and thus the purchasing powers of those currencies in terms of the non-tradable goods prices are different so that the PPP condition is challenged. Second, according to Balassa, the PPP theory gives emphasis to the monetary factors in the determination of prices [5, p. 200]. That is why the change in the PPP should be transferred to the exchange rate. But, there are real factors which can affect the price levels. These do not necessarily entail a need for exchange rate adjustment. Again, thinking that the equilibrium exchange rate is a fixed

number is also not plausible. This is especially critical with regard to the relative version of the theory.

In the empirical application of the theory the usual practice is to use aggregate price indexes like the GDP deflator or consumer price index for measuring the domestic level of prices and similar price indexes for the trading partners. One problem with this kind of analysis is the issue of aggregation. The price level measures stated above include not only non-tradables' prices but also tradables' prices for the domestic economy and not only tradables' but also non-tradables' for the trade partners. The implication for exchange rate adjustment of such an aggregation can be misleading [13, p.46].

The PPP theory has, therefore, been liable to criticisms and other methods of measuring the RER have been devised. These other RERs measure relative prices at a disaggregated level. The way of dis-aggregation is according to the purpose of measuring the RER. Such alternative measures are stated in section 2.1.2.

3.1.2 The Salter - Swan (Tradable - Non-Tradable goods) Approach

Devarajan, et. al. [13] have attributed the distinction between tradable and non-tradable goods to Salter and Swan. It is by following the foot steps of Devarajan, et al., that

this paper has come to say the Salter - Swan, tradable - non-tradable approach. From Edwards S. [18] it seems that the real exchange rate measured as the relative price of tradable to non-tradable goods is the current standard definition.

The literatures on why the real exchange rate defined as such varies; what implications do these variations have for policy formulation, production, consumption, and resource allocation in a country are plenty. This review is, therefore, selective. The criteria for selection have been access to the materials, their particular relevance to this thesis, and the contents of the materials (whether they are tenable for this paper's standard of knowledge - there are, for example, difficult materials to grasp). The paper has given emphasis to those materials which deal with the dynamics and behavior of the real exchange rate deeply. Edwards' three works [17, 18, and 19], Mussa M. [43] and Obstfield [44] are very relevant in this respect.

To begin with, Edwards S. [18] raised very important issues in dealing with the behavior and dynamics of the RER. The major ones are the following:

- 1) not all movements in the real exchange rates do require policy intervention. "Sometimes these changes in a country's degree of international competitiveness are 'justified' by real events in the economy such as technological progress, changes in external terms of trade, changes in

taxation and so on ... (these) are equilibrium phenomena and do not require policy intervention."¹¹

It is only in the case of departures of the actual RER from its equilibrium where policy intervention is required - that is , when there is mis-alignment in the RER;

- 2) the equilibrium RER is " ... the relative price of tradable to non-tradable, that, for given values of other variables, such as world prices, technology, and tariffs, equilibrates simultaneously the external and internal (that is , non-tradable) sectors."¹² By exposing this concept of the equilibrium RER and its fundamental determinants, he has contributed towards understanding the extent of mis-alignment of the RER and hence also for determining the form of policy intervention;
- 3) there are various ways of dealing with the mis-alignment of the RER. He stated that there are two basic types of mis-alignments - macroeconomic induced mis-alignment, which occurs when the actual RER departs from the equilibrium RER when the macroeconomic policies do not coincide with the official nominal exchange rate system; and structural mis-alignment, which occurs when the changes in the long run sustainable values of the real determinants (or fundamentals) of the

equilibrium RER are not translated in the short run to changes of the actual RER [p. 21].

In another work, Edwards S. [19] he developed a simple inter-temporal framework for analyzing the impacts of different structural adjustment and liberalization policies on the RER. He derived two basic theoretical results. These are:

(i). a relaxation of capital controls will result in increased foreign borrowing - under the assumption of a well-functioning domestic capital market - and will also result in an equilibrium appreciation of the RER; and

(ii). "... a trade liberalization reform (on the other hand) will have an ambiguous effect on the equilibrium RER. Depending on the strength of different forces, the reduction in tariffs can generate a RER appreciation or depreciation."¹³

The theory of the RER based on the Salter-Swan [tradable - non-tradable goods] model basically deals with why the RER moves and what does that movement imply.

3.2 The empirical literature on the real exchange rate

Most of the empirical literatures on the behavior and dynamics of the RER are written in the 1980's and 1990's.

examples include Edwards S. [17, 18, and 19], Elbadawi I. [20], DeGroot W.A. [25] and Devarajan S. [13].

In his study on the impacts of structural adjustment and stabilization policies on the RER, Edwards S. [19] selectively reviewed relevant empirical literatures on this issue. A cross country study done by himself [17] in 1989 and some country specific studies done by others in four Latin American Countries namely Argentina, Chile, Colombia, and Uruguay were reviewed.

In the cross-country study he used pooled data for 1962-1985 for twelve countries namely Brazil, Colombia, El-Salvador, Greece, India, Israel, Malaysia, the Philippines, South Africa, Srilanka, Thailand, and Yugoslavia. The equation estimated based on the pooled data was the following:¹⁴

$$\Delta \log \epsilon_t = \tau_1 \log(\text{TOT})_t + \tau_2 \log(\text{GCGDP})_t + \tau_3 \log(\text{TARIFFS})_t + \tau_4 (\text{KAPFLO})_t + \tau_5 \log(\text{TECHPRO})_t - \theta \log \epsilon_{t-1} - \lambda \text{EXCRE}_t + \delta \text{NOMDEV}_t + U_t \dots \dots \dots 3.2.1$$

Where:

- ϵ = bilateral RER defined as $E \cdot \text{WPI}_{\text{us}} / \text{CPI}$
- E = nominal exchange rate
- WPI_{us} = Wholesale Price Index of the US
- CPI = Consumer Price Index of the domestic economy
- TOT = external Terms of Trade defined as P^*_x / P^*_m
- P^*_x = the world price of exportables
- P^*_m = the world price of importables

- GCGDP = the ratio of Government Consumption of non-tradable to GDP
- TARIFFS = rate of import tariffs
- TECHPRO = measurement of technological progress
- KAPFLO = Capital Inflows (if negative, denotes capital outflows)
- EXCRE = Excess Supply for domestic credit, measured as the rate of growth of domestic credit minus the lagged rate of growth of real GDP (that is, $EXCRE_t$)
- = $d\log\text{Domestic Credit}_t - d\log\text{GDP}_{t-1}$
- NOMDEV = Nominal Devaluation; and
- U = Error Term

He classified the independent variables into three-monetary variables, which include EXCRE and NOMDEV; real variables, which include $\log\text{TOT}$, TARIFFS, KAPFLO, $\log\text{GCGDP}$ and TECHPRO; and lagged dependent variable; $\log e_{t-1}$. The results obtained were as follows:

TABLE 3.2.1¹⁵

REAL EXCHANGE RATE DETERMINATION IN DEVELOPING COUNTRIES

Dependent Variable ->	RER	ERER
Estimation Procedure ->	OLS	Instrumental variable
1. Monetary Variables		
EXCRE	-0.076 (-3.404)	---
NOMDEV	0.620 (11.13)	0.536 (8.439)
2. Real Variables		
logTOT	-0.054 (-1.748)	-0.043 (-2.371)
TARIFFS	-0.396 (-0.682)	----
KAPFLO	-0.195 (-1.948)	-0.231 (-1.406)
logGCGDP	-1.101 (-0.982)	0.054 (1.712)
Growth	0.496 (1.512)	0.997 (2.257)
3. Lagged Dep. Variables		
loge _{t-1}	-0.051 (-4.579)	-0.261 (-8.947)
X ²	53.4	52.1

Note:-- indicates that the variable was not included in the regression equation. X² is a chi-square test for the joint significance of the real variables.

He stated that the results shown in table 3.2.1 are consistent with the theory. Negative coefficient of the respective explanatory variables indicate that as the variables increase the RER decreases (or appreciates). The theoretical ambiguity about the effect of trade liberalization

reform on the RER stated at the end of section 3.1.2 is erased by the empirical result that a rise in import impediments generates an appreciation of the RER. As far as the ERER is concerned, he stated that the reaction of the ERER to liberalization depends on whether these policies are temporary or permanent. He referred to his previous work [17], for example, and stated, " although permanent EXCONT increases had a significantly negative effect [appreciation] on the RER, a temporary increase in this variable had an insignificant positive effect [depreciation]; where EXCONT is a variable measuring the level of foreign exchange control. Regarding capital flows, however, the results were not conclusive."¹⁶

The country-specific studies are basically of similar kinds as the above cross-country study.¹⁷ There are questions to be raised with regard to these analyses of cross-country and country-specific studies. First, to what extent can the RER defined as $E \cdot WPI^u / CPI$ serve as a measure of international competitiveness? Second, what were the criteria for choosing the twelve countries studied? These questions have not been given any attention in those empirical studies.

Another empirical study on the dynamics and behavior of the RER was done by Groot W.A. [25]. He made his study on the relationship between adjustment policies and the RER in Kenya since 1975. He gave an intuitive analysis of why and how the RER's moved in Kenya since 1975. He identified monetary and fiscal policies, nominal devaluation, and external shocks like

the coffee boom of 1976-1977 as the determining factors. Expansionary monetary and fiscal policies at a fixed exchange rate leads to appreciation of the RER according to him and vice versa. The simple intuitive process he used in his analysis is how the domestic currency prices of tradables and non-tradables moved in response to fiscal, monetary, and exchange rate policies and also in response to external shocks.

One major drawback of that study is that it has not dealt with the issue of mis-alignment. The observed movement in the RER might be an equilibrium phenomena.

The selective review of literature done in this chapter, both theoretical and empirical, gives an impulse for looking at the behaviour and dynamics of the RER of the "Birr". To appreciate the timeliness of the matter one can note the following two things. First, no strong attempt has been done so far on this issue. Second, the RER is a very important price whose behaviour and dynamic interactions with other relevant variables must be known for any macroeconomic policy formation - especially those concerned with the performance of the external sector. This paper, therefore, attempts to fill this gap.

CHAPTER FOUR

THE DYNAMICS AND BEHAVIOR OF THE REAL EXCHANGE RATE OF THE 'BIRR' AND ITS SIGNIFICANCE.

4.1 Introduction

The 'behavior' of the real exchange rate, here, refers at least to two things. First, it refers to the time series properties of the various real exchange rate indexes. Here, the short-term and the long-term time series properties can be identified. The questions are whether there is a trend or not, and whether the various indexes are stationary or non-stationary. Second, it refers to the statistical properties of those indexes, in which case the means, standard deviations, coefficients of variation, and correlation coefficients between the various indexes are included. The importance of dealing with these items is not to be questioned. It helps to see, for example, whether there is any difference between using multilateral and bilateral real exchange rate indexes for policy purposes. This can be observed from the correlation coefficients between the multilateral and bilateral indexes. If they are negative and/or small and positive, it means that there is a difference and if not there is no difference between using the multilateral and bilateral real exchange rate indexes when formulating relevant policies. The correlation coefficients also help to see whether it makes any difference for policy purposes if one defines the real exchange rate in any possible

way. There are definite advantages of looking at the other statistical properties [see section 4.2]. Looking at the time series properties is also important, for example, in modelling the real exchange rate.

In order to (properly) explain why the real exchange rate behavior looks what it looks like, the dynamic interactions between itself and other relevant variables must be portrayed through systematic analytical methods. This, first of all, requires a close scrutiny at how the real exchange rate is defined. If it is defined as the nominal (official or parallel market) rate corrected for the price differential between the foreign and the domestic economies (whichever prices), then, commercial policies like tariffs and quotas, fiscal policies, monetary policies, and exchange rate policies do affect it. If, on the other hand, it is defined in the same way as Elbadawi I. did [see section 2.1.2], for example, commercial policies like tariffs do not seem to have a direct influence on the actual real exchange rate. In fact they will have an effect if the non-tradable goods producing sector uses traded intermediate goods as inputs (like imported inputs). Also, to the extent that there are traded goods in the economy and the supply and demand of both traded and non-traded goods are determined by relative prices, changes in these relative prices due to commercial policy's impact on traded goods' prices can be transmitted to the equilibrium real exchange rate. But these effects are not as automatic as they are when the real exchange rate is defined as in the former case.

In looking at the behavior of the real exchange rate it must, also, be made clear as to which real exchange rate is in question. There are at least four kinds of real exchange rates to be identified within each definitional category. These are the bilateral official rates; the bilateral parallel market rates; the multilateral (effective) official rates; and the multilateral (effective) parallel market rates. The bilateral official and parallel market rates are those rates constructed using the official and parallel market nominal exchange rates respectively and with a single currency. Whereas, the multilateral (effective) official and parallel market rates are those rates constructed using the official and parallel market nominal exchange rates respectively and with a basket of currencies. For the behaviors and dynamics of these real exchange rates do not necessarily be similar, a separate look at all of this is a justifiable task.

The very simple but tempting way of looking at the real exchange rate behavior shaping impacts of the relevant variables is to see how these variables, on the one hand, and the price indexes and the nominal exchange rates used in the construction of the various real exchange rate indexes, on the other, are related. This is tempting because the interactions between these two sets of variables are not straightforward. The variables which affect the real exchange rate are plenty. Mussa M. [43], for example, stated commercial policy variables like tariffs and quotas; fiscal policy variables like government spending and tax rates; monetary policy variables

like interest rate; and exchange rate policy variables - nominal devaluation or revaluation as the case may be. With very little loss of generality, however, one can classify these variables into two -monetary and real variables.

In what follows the paper proceeds as follows: In section 4.2 we will have a broad preliminary look at the behavior of the real exchange rate of the birr over the period 1960 to 1991 classified into two sub periods, 1960 - 1973 (period 1) and 1974 - 1991 (period 2). Here, the various statistical and time series properties will be exposed. It is a preliminary look because we do not see the dynamic interactions between the real exchange rate and its determinants (that are available). In sections 4.3 and 4.4 the dynamic aspects of the various real exchange rate indexes of the 'Birr' will be analyzed using relevant econometric techniques, and results reported respectively.

4.2 A Broad Preliminary Look at The Behavior of the Real Exchange Rate Indexes of the 'Birr' [1960 - 1991]

4.2.1 The Issue

This preliminary look at the behavior of the real exchange rate of the 'Birr' focuses on the statistical and time series properties of the four indexes constructed for the period 1960-1991. These indexes are the real effective

exchange rate index constructed in line with the traditional purchasing power parity (ppp) approach (denoted by REERI 2) and that constructed in line with the Salter -Swan /tradable - non-tradable approach (denoted by REERI 1); and the bilateral real exchange rate index with the United States dollar constructed in line with the ppp approach (denoted by RERusI 2) and that constructed in line with the Salter-Swan approach (denoted by RERusI 1).

At this juncture it would be plausible to note how these four varieties of the real exchange rate for the 'Birr' have been computed. The following four formula are used to compute RERus2I, RERus1I, REER2I, and REER1I, respectively:

$$1) \text{ RERus2I} = E_{us} * \text{CPI}_{us} / \text{CPI}_{eth} \dots\dots\dots 4.2.1$$

$$2) \text{ RERus1I} = E_{us} * \text{WPI}_{us} / \text{CPI}_{eth} \dots\dots\dots 4.2.2$$

Where, E_{us} is the nominal exchange rate of the birr with the united states dollar measured as the amount of birr paid for one unit of the united states' dollar; CPI_{us} is the consumer price index of the united states; CPI_{eth} is the consumer price index of Ethiopia proxied by that of Addis Ababa and is taken in equation 4.2.2 as a proxy for the price of nontradables; and WPI_{us} is is the whole sale price index of the United States and is taken as the proxy for the price of tradables.

$$\text{REER2} = \sum \frac{W_{jt} * E_{jt} * \text{CPI}_{jt}}{\text{CPI}_{eth}}$$

$$REER1 = \sum \frac{W_{jt} * E_{jt} * WPI_{jt}}{CPI_{eth.}}$$

Where, W_{jt} is the average trade share of country j (the respective country noted in appendix IV), which runs from 1 up to 17 at the respective time t , which runs from 1960 up to 1991; E_{jt} is the nominal exchange rate of the respective trade partner j against the birr; CPI_{jt} is the consumer price index of the respective trade partner j of Ethiopia at time t ; and WPI_{jt} is the whole sale price index of the respective country j at time t and is a proxy for the price of tradables.

The statistical and time series properties of these four indexes are summarized in tables 4.2.2 and 4.2.3. In table 4.2.2, the means, standard deviations, coefficients of variation which are the ratios of standard deviations to the means of the first differences of the respective indexes, trend coefficients obtained by regressing each index (once differenced) on time and the respective t -values, the maximum and minimum values for each index, and the correlation coefficients between the various first difference indexes are reported. In table 4.2.3 the trend coefficients obtained by applying the 'method of averages' 18 to each index is reported. This is done for the sake of curiosity whether the trend of the various indexes observed from the trend coefficients obtained by applying the OLS of the relationship between each index and time separately are reliable. It is shown that there

is consistency between the results obtained using the two methods.

For analytical purposes, the whole period of 1960-1991 is divided into two sub-periods; the pre-revolution period (1960-1973 = period 1) and the post-revolution period ('Derg' regime) (1974-1991 = period 2). This division helps to see whether there were changes in the behaviors of the RER indexes over the two periods stated. The real exchange rate indexes in the two periods are, therefore, in some sense, analyzed separately. In this respect it is worthwhile to mention that the base years used in constructing the four indexes for the two periods are different; 1963 for period 1 and 1985 for period 2. We can not, therefore, compare the index of any year in period 1 and the same index on some other year in period 2 as they appear in table 4.2.1. What we can compare is the overall behavior of an index in period 1 and its counterpart in period 2 and /or the overall behavior of an index in period 1/period 2 and that of some other index in period 1/period 2 respectively.

4.2.2 Variability, Trends, and The Relationships between the Various Indexes

From table 4.2.2 it is observed that the coefficients of variation of the first differences of REER2I and RERus2I have increased from period 1 to period 2 (column 4). This shows, that the variability of the PPP real exchange rate of the

'Birr' has increased from period 1 to period 2 both in effective and bilateral terms. This increased variability of the real exchange rate of the 'Birr' may be attributed to the fall of the Bretton Woods system of fixed exchange rates. It is remembered that during the Bretton Woods period most countries of the world were pegging their currencies to the United States' dollar. The coming to a halt of the Bretton Woods system of fixed exchange rates in 1971 made the nominal exchange rates of major industrial countries, which are the major trading partners of Ethiopia (even currently), volatile against the United States dollar. Whereas, the nominal exchange rate of the 'Birr' against the United States' dollar since around the beginning of the post-bretton woods era (that is, beginning from 1973) remained fixed until October 1992. This means, therefore, that the real exchange rate of the 'Birr' tended to increase in its variability.

When the change in variability from period 1 to period 2 of the various indexes is compared (column 4, P_1 and P_2), the change in variability was the highest for $RERus2I$ (+2195.5 percent) and the lowest for $REER1I$ (-55.9 percent). The fact that the variability in $REER1I$ and $RERus1I$ fallen from period 1 to period 2 while nominal exchange rate was floating can be explained by a counterbalancing movement in the whole sale price indexes of the major trade partners.

The difference in the variability of the real exchange rate indexes can also be seen from the change in the ratio of

the maximum to the minimum values of those indexes from period 1 to period 2. Thus - done, these ratios for REER2I, REER1I, RERus2I and RERus1I were 50.0, 107.8, 14.8, and 37.7 percent higher in period 2 than in period 1 respectively. This measure of variability, unlike the coefficient of variation, indicates that all indexes were higher in variability in period 2 than in period 1. Though we can not reject the importance of this ratio as a measure of variability, the coefficient of variation is a stronger measure for it and greater attention is given to it in this study.

Table 4.2.1

REAL EXCHANGE RATE INDEXES OF THE BIRR OVER THE TWO
SUB-PERIODS, 1960-1973(PERIOD 1) AND 1974-1991(PERIOD 2)

YEAR	REER 2	REER 1	RERus 2	RERus 1	REER 2I	REER 1I	RERus 2I	RERus 1I
1960	1.1556	1.2258	2.5101	2.6199	88.63	94.01	100.40	104.80
1961	1.3011	1.3533	2.5362	2.6092	99.79	103.79	101.45	104.37
1962	1.2952	1.3069	2.5093	2.5321	99.33	100.23	100.37	101.28
1963	1.3039	1.3039	2.5000	2.5000	100.00	100.00	100.00	100.00
1964	1.3037	1.3108	2.4755	2.4853	99.98	100.53	99.02	99.41
1965	1.0644	1.0520	1.9922	2.3256	81.63	80.68	79.69	93.02
1966	1.1324	1.1087	2.1106	2.6800	86.85	85.03	84.42	107.20
1967	0.9158	1.0482	1.7782	2.6800	70.24	80.39	71.13	107.20
1968	0.9468	1.0942	1.8496	2.1941	72.61	83.92	73.98	87.76
1969	0.9870	1.1337	1.9341	2.6965	75.70	86.95	77.36	107.86
1970	0.9490	1.0874	1.8479	2.7098	72.78	83.40	73.92	108.39
1971	0.9366	1.0525	1.7748	2.8687	71.83	80.70	70.99	114.75
1972	1.0605	1.1770	1.9413	3.3863	81.83	90.27	77.65	135.45
1973	0.9557	1.1331	1.7025	3.1656	73.30	86.90	68.10	126.02
1974	1.3406	1.5971	3.0193	3.9550	170.41	209.13	145.86	191.00
1975	1.4158	1.6346	3.0988	4.0222	179.97	214.04	149.70	194.31
1976	1.1359	1.3220	2.5525	3.2908	144.39	173.10	123.31	158.98
1977	1.0679	1.2385	2.3303	2.0996	135.74	162.17	112.57	101.43
1978	1.0638	1.1187	2.1967	2.8263	135.22	146.48	106.12	136.54
1979	1.0353	1.1440	2.1043	2.7028	131.60	149.80	101.66	130.57
1980	1.1304	1.2225	2.2848	2.8272	143.69	160.08	110.38	136.58
1981	1.0685	1.1465	2.3761	2.8340	135.82	150.12	114.79	136.91
1982	1.0224	1.0558	2.3866	2.6607	129.96	138.25	115.29	128.54
1983	1.0229	1.0431	2.4765	2.7252	130.02	136.59	119.64	131.65
1984	0.9262	0.9355	2.3833	2.5733	117.73	122.50	115.14	124.31
1985	0.7867	0.7637	2.0700	2.0700	100.00	100.00	100.00	100.00
1986	0.9883	0.9724	2.3385	2.4372	125.63	127.33	112.97	117.74
1987	1.1160	1.0900	2.4864	2.5428	141.86	142.73	120.12	122.84
1988	1.1021	1.0798	2.4150	2.4787	140.09	141.39	116.67	119.74
1989	1.0289	1.0169	2.3470	2.4245	130.79	133.15	113.39	117.13
1990	0.8721	0.8148	2.3530	2.4421	110.86	106.69	113.67	117.98
1991	0.6664	0.6106	1.8073	1.9001	84.71	79.95	87.31	91.79

NOTE: 1963=100 for period 1 While 1985=100 for period 2.

SOURCE: Calculated from the data of appendices I through IV

Table 4.2.2
Some statistical and time series properties of the RER indexes of the Birr
over the period 1960-1973(P1) and 1974-1991(P2)*

		Statistical and time series properties																							
(1)	(2)	(3)				(4)				(5)				(6)				(7)				(8)			
	Means	Standard deviations				Coefficients of variation				Trend coefficients				Maximums				Minimums				Correlation matrix			
	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	DREER2I	DREER1I	DRERus2	DRERus1I	
DREER2I	-1.18	-1.27	8.86	11.89	750.8	936.2	-2.2	-2.9	100.00	179.97	70.2	84.71	1.0000												
DREER1I	-0.55	-2.23	7.55	13.49	1372.7	604.9	-1.3	-5.3	103.79	214.04	80.7	79.95	0.9499	1.0000											
DRERus2I	-2.49	0.23	7.48	15.86	300.4	6896	-2.8	-1.5	101.45	149.70	68.1	87.31	0.8901	0.8874	1.0000										
DRERus1I	1.63	-2.78	11.39	18.99	698.8	683.1	1.8	-3.7	135.45	194.31	87.8	91.79	0.6313	0.5935	0.6396	1.0000									
							(2.7)	(-4.3)																	

Source : Calculated from tables 4.2.1 and 4.2.1.1 by applying OLS in some cases

* : Note that columns 5, 6, and 7 are based on levels while all the others are based on first differences of the respective indexes

The D's preceding each index denote that they are first differences

Note also that the correlation matrix is done for the whole series ,i.e. 1961-1991

and that the coefficients of variation are in absolute values.

TABLE 4.2.1.1

REAL EXCHANGE RATE INDEXES OF THE BIRR
(1963 = 100)

YEAR	REER 2I	REER 1I	RERus 2I	REERus 1I
1960	88.63	94.01	100.40	104.80
1961	99.79	103.79	101.45	104.37
1962	99.33	100.23	100.37	101.28
1963	100.00	100.00	100.00	100.00
1964	99.98	100.53	99.02	99.41
1965	81.63	80.68	79.69	93.02
1966	86.85	85.03	84.42	107.20
1967	70.24	80.39	71.13	107.20
1968	72.61	83.92	73.98	87.76
1969	75.70	86.95	77.36	107.86
1970	72.78	83.40	73.92	108.39
1971	71.83	80.70	70.99	114.75
1972	81.83	90.27	77.65	135.45
1973	73.30	86.90	68.10	126.02
1974	102.82	122.49	120.77	158.20
1975	108.58	125.36	123.95	160.88
1976	87.12	101.39	102.10	131.63
1977	81.90	94.98	93.21	83.98
1978	81.59	85.79	87.87	113.05
1979	79.40	87.74	84.17	108.11
1980	86.69	93.76	91.39	113.09
1981	81.95	87.93	95.04	113.36
1982	78.41	80.97	95.40	106.43
1983	78.45	79.99	99.06	109.01
1984	71.03	71.75	95.33	102.93
1985	60.33	58.57	82.80	82.80
1986	75.80	74.57	93.54	97.49
1987	85.59	83.59	99.46	101.71
1988	84.52	82.81	96.60	99.15
1989	78.91	77.98	93.88	96.98
1990	66.88	62.49	94.12	97.68
1991	51.11	46.83	72.29	76.00

Coming to the trend coefficients, column 5 of table 4.2.2 and columns 2 and 3 of table 4.2.3, it can be seen that there were, in general, negative trends in the real exchange rate indexes of the 'Birr' which are indicators of real exchange rate appreciation. As one goes from period 1 to period 2 one can see an increase in the absolute values of these trend coefficients, indicating increases in the rates of real appreciation. An exception, here as well, is the case of RERus2I. It showed a fall in the rate of appreciation. It should also be noticed that RERus1I had a positive trend coefficient in period 1 indicating that the real exchange rate of the 'Birr' with respect to the US dollar had a depreciating trend in the pre-revolution period.¹⁹

TABLE 4.2.3

Trend Coefficients of the Real Exchange Rate Indexes of the 'Birr' over the Periods 1960 - 1973 (period 1) and 1974 - 1991 (period2) using the 'Method of Averages'.

(1) INDEXES	TREND COEFFICIENTS	
	(2) PERIOD 1	(3) PERIOD 2
1. REER2 I	-2.8147	-2.7791
2. REER1 I	-1.4641	-5.0967
3. RERus2I	-3.1065	-0.9972
4. RERus1I	+1.5786	-3.3548

Source: Calculated from columns 5 to 8 of table 4.2.1

*: see note number 18

The question of how these trends and variability can be explained is postponed to sections 4.3 and 4.4 below. In section 4.3 the four real exchange rate indexes are regressed,

turn by turn, on the basic explanatory variables to see the dynamic aspects of the real exchange rate of the 'Birr' over the two periods.

From the correlation matrix (column 8) of table 4.2.2, it can be observed that the various real exchange rate indexes of the 'Birr' had all positive correlation coefficients. The DREER2I had a positive and very large correlation coefficient with DREER1I and DRERus2I . This would suggest that whether one takes the trade weighted index of the real exchange rate or the bilateral real exchange rate index with respect to the US dollar as reference in formulating relevant economic policy does not matter. This is indicated by the positive and large correlation coefficients between DREER2I and DRERus2I. It also suggests that whether one takes the consumer price indexes or whole sale price indexes for partner countries in calculating the real exchange rate of the 'Birr' does not matter. This is obvious from the positive and large correlation coefficient between DREER2I and DREER1I. The validity of these suggestions derived from these correlation coefficients, however, depends on complete analysis of the trend, variability and dynamic aspects of the indexes.

As far as the time series property is concerned the Dickey Fuller and Augmented Dickey Fuller Unit-root tests for stationarity indicate that all the real exchange rate indexes were non-stationary but their first differences were not so. [see appendices V and VI].

4.3 Dynamics in the Real Exchange Rates of the 'Birr'[1960 -1991]

There have been attempts to explain why the real exchange rates (various versions) move in a way they do in various countries. Because movement refers to time, there are two aspects of it - equilibrium (or long-run) movements and short-term (most likely disequilibrium) movements. The former one refers to the so-called steady-state path where as the latter refers to the short-run fluctuations due to various reasons.

A sound theoretical relationship must be established between the dependent and explanatory variables before going to the actual data on the relevant time series variables and see the facts. Thus, a long run equilibrium relationship between the real exchange rate, on the one hand, and the variables known as the real exchange rate fundamentals like terms of trade, fiscal policy variables, monetary policy variables, and trade policy variables, on the other, is postulated in theories related to real exchange rate economics.

To look at the matter in real life situation, the data must be worked out and see whether the postulated equilibrium relationship is sensible. A postulated equilibrium relationship is sensible only if the following two conditions are met [section 1.4.3]:

- i) all the series (both the dependent and explanatory ones) are integrated of the same order (say x); and
- ii) there is a vector of coefficients, say \mathbf{a} , that makes a linear combination of those series integrated of order, say y , where $y < x$.

If the data meet these requirements and the postulated equilibrium relationship is proved sensible, then the process of the short-run dynamic adjustment of the series to the postulated equilibrium level can be worked out using the relevant Error Correction specification.

Coming to the issue of the real exchange rate S. Edwards [17, p.135] postulated that there is an equilibrium relationship between the real exchange rate (RER) on the one hand, and external terms of trade (TOT) defined as the ratio of foreign price of exports to the foreign price of imports, government consumption on non-tradables (GCN), measure of the extent of deficit financing (DEH), excess supply for credits (EXCRE), exchange controls (EXCON), and ratio of investment to GDP (INVGDP), on the other. What this assumes (implicitly) is that all these seven variables are integrated of the same order (x) and a certain linear combination of them is also integrated of order y which is less than x .

One more and very important point to note before we proceed to the main theme of this section is that the issue of misalignment of the real exchange rate and related policy

implications have got their base in kinds of analyses outlined in the previous paragraphs of this section. If the postulated equilibrium relationship stated above makes sense and conventional regression analyses thus gives the fitted values of the real exchange rate, those fitted values can be taken as good proxies of the equilibrium real exchange rate. Then, the difference between these fitted values and the actual real exchange rate would be an indicator of the extent of misalignment of the real exchange rate. This would serve as a good indicator of the level of nominal devaluation or revaluation (as the case may be) necessary to bridge the observed misalignment, *ceteris paribus*.

4.3.1 Modelling the Equilibrium Real Exchange Rate (ERER)

In dealing with the modelling of the ERER, it is necessary to bear in mind that the ERER is not an immutable number. If there are changes in some variables which affect the internal and/or the external equilibrium of a country, the ERER will also be changed. Six of such variables and their relationships to the ERER are intuitively analysed in this section.

The general theoretical model for the ERER is given by the following equation:

$$\text{BERERI}_i(\text{REERI}_i) = f_i(\text{TOTI}_i, \text{GCGDPI}_i, \text{INVGDP}_i, \text{EXCREI}_i, \text{DEHI}_i, \text{EXCONI}_i)$$

.....4.1

where, BERER refers to the bilateral equilibrium real exchange rates, EREERI refers to the multilateral equilibrium real exchange rates.

$i = 1, 2$ $t = \text{time}$

The meanings of the six explanatory variables stated above and the theoretical transmission mechanism are discussed below. These explanatory variables are called in the literature the real exchange rate fundamentals. These six RER fundamentals are TOT, which is the ratio of the foreign price of exports to that of imports; EXCON, which is the extent of trade controls proxied by the implicit import tariff rate calculated as the ratio of tariff revenue from imports to the total value of imports; GCGDP, which is a proxy for the government consumption of non-tradables measured as the ratio of government consumption spending to real GDP; INVGDP, which is the ratio of investment spending to GDP and is a variable destined to capture the effect of capital accumulation on the equilibrium real exchange rate; EXCRE, which is a proxy for excess supply of credits and is measured by the rate of growth of domestic credits less the lagged rate of growth of real GDP; and finally DEH, which is the ratio of government deficits to lagged high powered money, and is destined to capture the impact of deficit financing.

4.3.1.1 TOTI and Equilibrium Real Exchange Rate (ERERI)

According to S. Edwards (17) the traditional wisdom about the relationship between these two variables is such that a deterioration in TOT leads to an equilibrium real depreciation. That is a negative relationship between the two for the argument is that if the TOT deteriorates, which amounts to a fall in real income, the demand for non-tradables will fall. To insure equilibrium, the price of non-tradables will fall and the real exchange rate tends to depreciate. Such depreciation is an equilibrium depreciation. This argument lays emphasis upon the income effect.

Elbadawi I [20], however, noted that the impact of TOT deterioration on the equilibrium real exchange rate depends on what caused the deterioration. If it is caused by a decline in the foreign price of exports then the effect would be the same as the traditional wisdom stated above. But, if it were caused by a rise in the foreign price of imports the effect would be to the contrary. As he stated in foot note number 21 (p.17) "... in the case of a rise in the price of imports income and substitution effects work in opposite directions whereas they reinforce each other in the case of a fall in the price of exports."

What do the Ethiopian data say about this? This question will be dealt with in this section.

4.3.1.2 EXCONI and ERERI

Owing to the definition of EXCON as the ratio of tariff revenues on imports to total value of imports (which is an implicit import tariff rate), it can be argued that the traditionally accepted view that "a reduction in tariffs in a small country always "requires" a real (equilibrium) depreciation to maintain external balance"[17, p.26], is tantamount to a negative relationship between EXCON and ERER for a given value of imports and for the real exchange rate definition held in this study. This is a simplistic approach in the sense that it is based on a partial equilibrium analysis for it considers only the foreign sector and secondly it doesn't take the intertemporal aspect into account.

S. Edwards [17] has presented an intertemporal framework for analysing the interactions between the equilibrium real exchange rates and tariffs in a general equilibrium context. The intuition behind the analysis is that when tariff is imposed this will have an effect not only on the external sector (or tradable sector of the economy) but also on the internal sector (or the non-tradable sector of the economy); intertemporal substitution in consumption is initiated, and intertemporal resource allocation will set in. These will have a bearing on the path of the equilibrium real exchange rate and on the depreciation or appreciation of the real exchange rate as the case may be.

What is important here, however, is the question of how the equilibrium real exchange rate and EXCON are related. Given the conclusion derived from various works of S. Edwards [17 and 18 for example], the equilibrium real exchange rate is a function only of real variables in the long-run. This amounts to looking at the regression results obtained from regressing real exchange rates on the other fundamentals and EXCON. This is done using the Ethiopian data in this section. What do the results show ?

4.3.1.3 GCGDPI and ERERI

The change in the pattern and/or magnitude of government consumption has got an impact on the path of the equilibrium real exchange rate. The intuition that lies behind this relationship is very simple. When government consumption on non-tradables increases, the price of non-tradables tends to rise and given the definition of the real exchange rate as the ratio of the price of tradables to that of non-tradables, this means an appreciation in the equilibrium real rate.

How the government finances this expenditure matters. If the government finances it by increasing debt, then it means that in the future the debt repayment requires raising of government revenue through, for example, an increase in taxes. This means a reduction in income and thus demand for all types of goods. If the fall of demand for non-tradables is higher, for example, and prices of non-tradables fall higher than that

of tradables, there will be a tendency for the equilibrium real rate to depreciate. What do the Ethiopian data say about this relationship ?

4.3.1.4 INVGDP, EXCREI, and DEHI and ERERI

Capital accumulation or decumulation has, also, got an impact on the equilibrium real exchange rate since it signifies an injection into the macro economic performance of the economy under consideration.

The equilibrium path of the real exchange rate is also affected by EXCRE and DEH. An increase in EXCRE, for example, is an indicator of expansive credit policy and thus induces an equilibrium real exchange rate appreciation. Similarly, an increase in DEH is an indicator of a deterioration in government deficit position and this also has got an appreciating impact on the equilibrium real exchange rate.

The theoretical sketch of the intuition that lies behind the hypothesized relationships between the real exchange rate fundamentals and the equilibrium real exchange rate is a good springboard towards looking into what is actually happening in the economy. In section 4.3.3 the longrun and the shortrun empirical models of the real exchange rate of the birr are estimated by an OLS procedure. The results are summarised with the help of tables 4.3.1 and 4.3.2.

The shortrun dynamic adjustment equations are given in the literature by the following general description:

$$\begin{aligned} \text{DBRER}_{it} \text{ (DREERI}_{it}\text{)} = & g_i(\text{DTOTI}_{it}, \text{DGCGDPI}_{it}, \text{DINVGDP}_{it}, \\ & \text{DEXCREI}_{it}, \text{DDEHI}_{it}, \text{DEXCONI}_{it}, \text{ and} \\ & E_{it-1}). \end{aligned}$$

..... (4.2)

where BRER refers to the bilateral real exchange rates; D's preceding each variable denotes first differences; and E_{it-1} is the corresponding error correction term, which is the error term obtained from the respective longrun regression equation lagged by 1

4.3.2 Data Characteristics

The statistical and time series properties of the four dependent variables have been explained in detail in section 4.2.2. It is, then, observed that all the four real exchange rate indexes constructed in this paper were all $I(1)$ variables; which means they were all integrated of order one.

A further look at appendixes V and VI would give us the result that TOTI, EXCONI, GCGDPI, EXCREI, and DEHI are also $I(1)$ variables if we take $\text{ADF}(1)$, with trend, as the relevant t-test statistic. But INVGDP is not $I(1)$. It is, therefore, expected that the four dependent variables, each taken at a time, on the one hand, and the five $I(1)$ explanatory variables are cointegrated.

To test for the cointegration relationship, unit root tests have been undertaken on the respective error terms and it is observed that three cointegration relationships are sensible. These cointegration relationships are those given by equations 4.1.1, 4.1.2, and 4.1.3 in table 4.3.1. The variable DEHI is not included in the longrun equation on the account of its high level of insignificance and the expectation that its impacts are largely captured by EXCREI.

Based on the results from these stationarity tests on the data the empirical shortrun dynamic adjustment model for the real exchange rate of the birr is, thus, worked out. These shortrun counterparts of the cointegration relationships are given by equations 4.2.1 , 4.2.2 , and 4.2.3 of table 4.3.2.

Table 4.3.1

Long-Run (Equilibrium) Real Exchange Rate Equations (OLS)*

Explanatory Variables	Eq. No. Dep. Var.	4.1.1 EREER2I	4.1.2 EREER1I	4.1.3 ERERus2I
Constant		93.1844 (8.7591)	91.9921 (7.3818)	91.0615 (7.9059)
TOTI		-0.0277 (-0.4244)	-0.0014 (-0.019)	0.001 (0.0145)
EXCONI		-0.0387 (-0.7446)	0.0286 (0.4704)	-0.1177 (-2.092)
EXCREI		0.1561 (3.9839)	0.1685 (3.6714)	0.2021 (4.7629)
INVGDP		----- -----	----- -----	----- -----
DEHI		----- -----	----- -----	----- -----
GCGDPI		-0.0807 (-2.6033)	-0.1177 (-3.242)	0.0106 (0.3167)
R ²		0.4631	0.5275	0.4577
D.W.		1.2693	1.054	1.2365
F(4, 27)		7.6836	9.6521	7.5402

Note: Values in parentheses are the respective t-values.

---- means that the variables were not included.

* There is no longrun relationship between ERERus1I and the other explanatory variables and thus is not included.

4.4 Interpretation of results

Before going to the interpretation of the results obtained it is important to get informed that there are few problems associated with the modelling aspect. First, theory suggests that 'temporary' and 'permanent' changes in the fundamentals have got different effects on the ERER and thus modelling of the ERER should give attention to such distinctions. This distinction is not considered here because of the difficulty of separating the 'temporary' from the

'permanent' one. Second, the theoretical definition of the ERER is that it is the relative price of tradables to nontradables which gives rise to a simultaneous attainment of external and internal equilibrium for a given set of sustainable values of the RER fundamentals. This implies that it is the movement of the sustainable values of the fundamentals which must be taken as the explanatory variables in the ERER determination. But such a distinction between actual and sustainable values of the fundamentals is not done here again because of the difficulty of determining what sustainable is. Third, the theory of the RER suggests that expectations about the RER fundamentals by economic agents have got impacts on the equilibrium path of the real exchange rate. This is also not taken into account in this model. In spite of these, however, the co-integration relationships derived out of the stationarity test results reported in appendixes V , VI and VII give meanings to the econometric results obtained.

4.4.1 Results of the longrun relationships

Technically interpreted the coefficients of the RER fundamentals listed in table 4.3.1 are the cointegrating parameters. If one takes equation 4.1.1, for example, the cointegrating parameters are -0.0279, -0.0387, 0.1561, and -0.0807. This means that the gravitational plane (in the RERs and RER fundamentals space) towards which the actual planes, that are constructed by the various combinations of the actual

values of the explanatory and explained variables at different points of time, are to be gravitated in the long run is to be given by the relation:

$$\begin{aligned} \text{EREER2I}_t = & 93.1844 - 0.0277\text{TOTI}_t - 0.0387\text{EXCONI}_t + \\ & (8.7591) \quad (-0.4244) \quad (-0.7446) \\ & 0.1561\text{EXCREI}_t - 0.0809\text{GCGDPI}_t \\ & (3.9839) \quad (-2.6033) \\ R^2 = & 0.4631 \quad \text{D.W.} = 1.2693 \\ F(4,27) = & 7.6836 \end{aligned}$$

Figures in parentheses are t-values

The gravitational planes for the other two cointegration relationships (that is equations 4.1.2 and 4.1.3) can be similarly shown. [For a better understanding of this gravitational concept, 21, pp.1-15 is a good reference].

The intuition that lies behind this technical interpretation is that there is a certain force (market mechanism or government policy, for example) which makes the combination of the real exchange rate indexes and their fundamental determinants to move along a certain fixed path called the 'Equilibrium' path in the long run. What is implied from the analysis is, thus, that the actual values of the six RER fundamentals are the equilibrium (or sustainable) ones and so also are the fitted values of the various respective RER indexes.

Equations 4.1.1 and 4.1.2 denote the results for the determination of the two multilateral RER indexes. As the F statistics indicate the RER fundamentals are jointly significant in determining the RER. As the signs of the coefficients of the various RER fundamentals indicate the terms of trade deteriorating trend pushed the equilibrium REERs to appreciate. The extent of trade controls had different effects on EREER2I and EREER1I; whereas a rise in it had an appreciating impact on EREER2I, it had a depreciating impact on EREER1I. This difference can be explained by the difference in the movements of the whole sale and consumer prices of the Ethiopian trade partners. Surprisingly, an increase in the excess supply for credits had got a depreciating impact on the EREERs. In terms of significance, the t-tests indicate that EXCRE, and GCGDP are significant in determining the EREER's.

For the bilateral RER index also the variables were jointly significant in determining the equilibrium. The significance of the various fundamentals were a bit different compared with the case of the multilateral real rates. For EREERus2I determination EXCONI and EXCREI, were both significant whereas TOTI and GCGDPI were insignificant.

4.4.2 Results of the shortrun relationship

The results of the Error Correction specifications are also reported in table 4.3.2. All the variables are the first

differences of the variables reported in table 4.3.1 and LE_i is the Error Correcting term defined as the error terms obtained from the cointegrating regressions reported in table 4.3.1 and lagged by 1 (where i refers to regression numbers 4.1.1 up to 4.1.3).

Table 4.3.2

Short-Run Dynamic Adjustment Real Exchange Rate Equations (OLS)*

Expl. Varia.	Eq.No. Dep. Var.	4.2.1 ¹ DREER2I	4.2.2 ¹ DREER1I	4.2.3 ¹ DRERus2I
Constant		-1.2963 (-0.8548)	-0.7607 (-0.4351)	-0.7082 (-0.3705)
DTOTI		-0.0346 (-0.5924)	0.0299 (0.4256)	0.0196 (0.2517)
DEXCONI		-0.0667 (-1.0563)	-0.0872 (-1.1918)	-0.1192 (-1.4607)
DEXCREI		0.1473 (4.0168)	0.1865 (4.1181)	0.2182 (4.5255)
DINVGDP		-----	-----	-----
DDEHI		-----	-----	-----
DGCGDPI		0.1485 (1.482)	0.0719 (0.6204)	0.1865 (1.4410)
LE_i^2		-0.7692 (-3.6485)	-0.6781 (-3.0678)	-0.8006 (- 3.1558)
R^2		0.4056	0.3373	0.3992
D.W.		1.7315	1.5206	1.7851
F(5,25)		5.0937	4.0540	4.9863

- Notes: 1. Values in parentheses are the respective t-values.
 2. LE_i is the error term obtained from the regression equations 4.1.1 through 4.1.4 and lagged by 1. This term captures the error correcting mechanism.

* Error correction mechanism is for RERus1I is not applicable.

The results reported in table 4.3.2 indicate that the explanatory variables are jointly significant whereas most of

them are individually not significant. These are observed from the F-values and t-values respectively. The coefficients of the explanatory variables are interpreted as the short-run dynamic adjustment parameters. A negative coefficient, for example, indicates that the respective explanatory variable shows a fall in movement away from its correct value as the real exchange rate begins to drift away from its equilibrium value. This is to adjust the disequilibrium movement of the RER. A positive coefficient, on the other hand, shows that the respective explanatory variable increases in its movement away from its correct value as the real exchange rate begins to drift away from the equilibrium path.

4.4.3 A synthesis of the longrun and the shortrun results

The results on the dynamics of the real exchange rates of the 'Birr' reported in the sections 4.4.1 and 4.4.2 are not satisfactory. Especially the explanatory powers of the three long-run (equilibrium) real exchange rate models and the three short-run dynamic adjustment models presented in tables 4.3.1 and 4.3.2 respectively are very low. Multicollinearity between the explanatory variables is also there. Removal of some of the variables did not help and so it is preferred to take the risk of multicollinearity and get the results reported. The Durbin Watson statistics all fall in the inconclusive region and nothing can be said about serial correlation.

A basic problem to be associated with low explanatory powers of the models must be the inoperation of the market mechanism for the years between 1974 and 1991. As will be shown in chapter five the years between 1960 and 1973 indicated a sensible relationship between the real exchange rate fundamentals and the real exchange rate indexes. The problem of modelling only for that period has been small sample size.

Low explanatory powers, however, do not make the models useless. The joint significance levels as measured by the F-statistics, for example, has got policy implications. Also, the importance of EXCREI, and GCGDPI in the determination of the longrun multilateral real exchange rates must be given due attention. The importance of EXCONI and EXCREI in the determination of the longrun bilateral real exchange rate indexes must also be given considerable attention.

4.4.4 Misalignment of the real exchange rate of the 'birr'

Misalignment of the real exchange rate is generally defined as a sustained departure of the actual real exchange rate from its equilibrium value (see section 2.1.5). With a great caution we can take the fitted values of the various real exchange rate indexes from the respective models reported in table 4.3.1 as proxies of the respective equilibrium RER indexes. The difference between the actual RER indexes given

in table 4.2.1.1 and the respective fitted values from regression equations of table 4.3.1 give us the estimated levels of misalignment. These estimated levels of misalignment for the various versions of the RER of the birr are given in appendix VII. Though a future refinement must be made on these equilibrium real exchange rate indexes of the 'Birr', for now these are good benchmarks for measuring the extent of misalignment. According to the results of the models of table 4.3.1 and appendix VII the average levels of RER misalignments for REER2I, REER1I, and RERus2I over the last two years (that is the average of 1990 and 1991) were -9.52, -12.67, and -8.78 , and -16.88 respectively. These levels for the last two years of the pre-revolution period (that is the average of 1972 and 1973) were +2.10, +5.68, and -1.58 respectively. Negative values indicate that the actual real exchange rates were below the equilibrium real rates whereas positive values indicate the opposite; which in essence means there were misalignments in the real exchange rate indexes.

Misalignments of the real exchange rates impose severe losses of welfare and efficiency in an economy. They are usually accompanied by the imposition of a battery of exchange and trade controls intended to slow the drainage of foreign exchange reserves that occurs when the actual RER is over-valued or is below its equilibrium level. These controls induce large inefficiency costs. RER over-valuation can also greatly hurt exports thereby affecting the welfare of a society. [18, pp 21-23].

Although it is beyond the coverage of this study, it is imperative to state at this point that misalignment is caused by either or both of the following things: first, it can be caused by inconsistencies between macroeconomic policies and official nominal exchange rate system. If, for example, monetary policy becomes so expansive that it exceeds the path compatible with maintaining the predetermined nominal exchange rate, the price of domestic goods will tend to grow faster than the world inflation and thus misalignment sets in; and second, it can be caused by no translation of changes in RER fundamentals (in the short run) into changes of the actual RERs. The misalignment created by such a cause is what is called structural misalignment.

A separate study should be done on what caused the misalignment in Ethiopia over the last years of the period covered in this study. The proposition here is that a combination of structural factors and inconsistency between macroeconomic policies and the official exchange rate regime caused it.

CHAPTER FIVE

SOME STRUCTURAL CHARACTERISTICS OF THE ETHIOPIAN ECONOMY IN THE PAST AND LESSONS TO BE DERIVED

Structural Characteristics of an economy refer to the characteristics of the microeconomic, macroeconomic, and institutional forces which guide the micro and macroeconomic systems. These forces include, for example, taxes and tariffs at the micro level, and fiscal and monetary mechanisms at the macro level. Though a thorough study on such structural characteristics of the Ethiopian economy is important, that is not the intention of this chapter. What is rather intended is to see the structural changes in the real exchange rate fundamentals stated in the previous chapter and their effects on the time path of the various equilibrium real exchange rate indexes. The structural changes, here, refer to macro and/or microeconomic policy, and institutional changes for the purpose of improving resource allocation, increasing economic efficiency, and expanding growth potential.

As figures 4.1 and 4.2 indicate the time path of the RER indexes can be conveniently classified into three distinct phases. For the bilateral RER indexes these phases are 1960 - 1968 (phase 1), 1968 -1975 (phase 2), and 1975 -1991 (phase 3). For the multilateral indexes these phases are 1960 - 1966, 1966 - 1974, and 1975-1991 respectively. As one goes along the three phases one could see an appreciating, depreciating, and appreciating trends in that order in all of

the four indexes. The object of this chapter is thus to see whether this can be interpreted in relation to the structural changes stated in the previous paragraph.

5.1 Structural Changes in the RER Fundamentals

Figures 4.3 and 4.4 depict how the six indexes of the RER fundamentals considered in this study were moving between the years 1960 and 1991. It can be observed that the share of government consumption in total real GDP (GCGDP) and the ratio of government deficit to the lagged high powered money (DEH) had a rising trend over the whole period inspite of severe fluctuations along the path; whereas, the implicit import tariff rate (EXCON), and the terms of trade (TOT) had a declining trend with visible fluctuations in the interim period. But, the share of investment in the total gross domestic product (INVGDP) and excess supply for credits (EXCRE) showed a somewhat constant level around 100. Different from all the other five fundamentals, the INVGDP did not show a significant fluctuation.

A close scrutiny at figures 4.3 and 4.4 would suggest that the movements of the three RER fundamentals, namely EXCON, GCGDP and DEH can be conveniently classified into the three phases considered for the multilateral RER indexes; whereas, INVGDP, TOT, and EXCRE do not fit to such a definite pattern.

5.2 The Three Five Year Development Plans, 1957 -1973.

Three comprehensive and consecutive five year development plans were being undertaken in Ethiopia between the years 1957 and 1973 (G.C).

The first, the second, and the third plan periods respectively were from 1957 to 1961, from 1963 to 1967, and 1968 to 1973. The first two phases in the paths of the three RER fundamentals, namely EXCONI, GCGDPI, and DEHI and the two sets of RER indexes were, therefore, coincident with these three plan periods.

If we look at figures 4.1 and 4.2, we can see that at the last two years of the first plan period the REER1I and RER2usI were depreciating and REER2I and RERus1I were constant at 100 and 105 respectively. Over the second plan period, however, the two effective rates and RERus2I were both appreciating with very mild fluctuation, and RERus1I was depreciating. During the third plan period, we see that all the four rates were depreciating.

5.2.1 The Basic Achievements of the Three Plans and the Significances For The RER Movements

In light of chapter four, any action which can affect the terms of trade, the share of government consumption in total GDP, the share of investment in total GDP, the extent of trade control, the extent of excess supply for credits, and the

level of government deficit as the ratio to total GDP has got an impact on the behaviour of the real exchange rate. A review of basic achievements of the three plans is thus necessary to look at the sensibility of this causal link between the real exchange rates of the 'Birr' and the six variables stated above.

To see the significance of the achievements during the first five year plan period for the RER movements, one can be reminded that the foreseen increase of the national income over the plan period was 16 percent whereas that of total investment was a little above 60 percent. Furthermore, the achievement of the national income target was about 95 percent while that of investment was 124 percent. In effect what that meant was that the share of investment in total national income was highly increased by the end of 1961. According to the theory on the real exchange rate what this meant was that the equilibrium RER tended to appreciate, *cet par*, the logic of the argument being that the price of nontradables tended to increase as a result of expansive investment.

As it is indicated in the plan one of the main principles of the general economic policy was to take measures to regulate import and export in accordance with the general needs of economic development. To help the process of economic development it was believed that the then's tariff policy was to be adjusted so as to facilitate the imports of capital goods and goods in process and protect home

industries. Facilitating the imports of capital goods and goods in process required laying low or no tariff rate on those items; whereas, the protection of home industries required laying higher tariff rates on the imports of goods that could be produced domestically or be substituted by domestically produced ones. The impact on the extent of trade control was thus ambiguous. But, figure 4.3 indicate that EXCON, a proxy for the extent of trade control, showed an upward trend indicating that the trade control was becoming severe from 1960 to 1961. According to the theory of the real exchange rate what that meant was that the equilibrium RER was to appreciate. The proxies for the equilibrium RER indexes, in fact, showed an appreciation over 1960 to 1961; but the actual RER indexes showed depreciation [see figures 4.5 through 4.8].

The terms of trade over the last two years of the first five year plan period indicated a mild deterioration. Because it was to be determined in the international market, there was nothing planned about it. The reason for the deterioration was reported to be both the decreasing trend of agricultural prices and rising trend for the industrial goods on the world market. According to some theories of the RER dynamics [20, for example], the impact of the terms of trade deterioration, caused by a combination of a fall in export prices and a rise in import prices, on the equilibrium RER can not be unambiguous. If it were only because of a fall in export prices, however, the impact would be to depreciate the

equilibrium RER and if it were only due to a rise in import prices alone the result would be to appreciate it. But, in Ethiopia it was caused both by a fall in international price of exportables and a rise in the international price of importables and the equilibrium RER indexes appreciated from 1960 to 1961.

Another variable which has got an impact on the equilibrium movement of RER indexes is aid inflow [see 49]. However, it is not included in this thesis. One of the main principles of the general economic policy during the first plan period was to encourage private and public foreign investments in the various branches of the economy. As the first five year development plan document indicates the share of foreign financing in the total investment was about 50 percent and the achievement was also significant. According to V. Wijnbergen [49], this would mean a tendency towards appreciation of the equilibrium real exchange rate.

The facts during the second and third five year development plan periods were almost the same as those of the first plan period as far as these fundamentals were concerned. In terms of goals and objectives, the last two plans were very generous and almost in all of the cases they were successful. As the available documents indicate the annual average rates of growth over the second plan period were 2.3, 10.1, 52.6, 19.4, 27.3, 10.2, 11.6, 42.8, and 4.6 percent for agriculture, fishing and hunting, mining, power, manufacturing, building

and construction, financial intermediaries, community development, and gross national product respectively. It is no doubt that the achievement of such a bountiful economic goals required very high amount of investment. The planned annual average rate of growth of gross fixed capital formation of the government over the same plan period was 13.5 which was by far higher than that of GDP (4.3 percent). The government consumption expenditure was also predicted to have grown at an annual average rate of 7.5 percent over the same period which was also higher than that of GDP. As far as financing the investment spending was concerned one - third of it was to come from abroad and that accounted for a greater relevance of the inflow of funds. The pattern of trade control was the same as that of the first five year development plan period that imports of capital goods and goods in process were to be encouraged, whereas those of consumer goods were to be discouraged. Credit policy was such that credit supply was to be expanded highly. These undertakings were similar both over the second and the third five year plan periods.

According to the theory of the real exchange rates all these must have amounted to the appreciation of the equilibrium RER of the 'Birr'. In fact, from figures 4.5 to 4.8 it is observed that the equilibrium RER index proxies were showing an appreciating tendencies from 1960 to 1973.

The period from 1974 to 1991 was a highly command economy and thus it is hardly possible to derive any meaningful and

reliable conclusion as far as the relationship between the RER indexes and their fundamentals is concerned. However, the fact that the equilibrium and the actual RER indexes were showing appreciating trends is sensible under the Ethiopian condition.

5.3 Lessons for the Future

Some of the past structural characteristics of the Ethiopian Economy overviewed in the previous sections of this chapter give us some clue as to what will happen to the RER of the Birr in the future. Though it may be too early to conclusively say on the future behaviour of the real exchange rates of the 'Birr', the observed quarterly facts about them reported in table 5.3.1 and figures 4.9 and 4.10 do suggest some important characteristics.

TABLE 5.3.1

Effective and Bilateral Real Exchange Rates since 1991

Year	REER2	REER1	RER2u	RER1u	REER2I	REER1I	RER2uI	RERu1I
1992 QI	0.46	0.39	1.56	1.47	100.00	100.00	100.00	100.00
QII	0.44	0.37	1.50	1.41	95.65	94.87	96.15	95.92
QIII	0.43	0.37	1.44	1.35	93.48	94.87	92.31	91.84
QIV	1.04	0.86	3.47	3.24	226.09	220.51	222.44	220.41
1993 QI	1.06	0.86	3.56	3.31	230.43	220.51	228.21	225.17
QII	1.03	0.84	3.48	3.24	223.91	215.38	223.08	220.41
QIII	1.04	0.83	3.54	3.27	226.09	212.82	226.92	222.45
QIV	1.07	0.86	3.66	3.36	232.61	220.51	234.62	228.57
1994 QI	1.05	0.76	3.62	3.31	228.26	194.87	232.05	225.17
QII	1.13	0.81	3.84	3.51	245.65	207.69	246.15	238.78

Source: Calculated from data obtained from the "International Financial Statistics (various years)" of the IMF.

As one can see from figures 4.9 and 4.10, the nominal devaluation of the 'Birr' against the U.S. dollar done on October 1992, has succeeded in depreciating both the bilateral and effective real exchange rates. As the nominal exchange rate of the Birr against the U.S. dollar was depreciated from 2.07 birr /U.S. dollar to 5.00 birr/U.S. dollar from 1992 quarter III to 1992 quarter IV (i.e. by 141.4 percent), the REER2, the REER1, the RER2us, and the RER1us depreciated by 141.8, 132.4, 140.9 and 140 percent respectively. Over the next six quarters considered (that is 1993 quarter I up to 1994 quarter II) the various real exchange rates indexes showed mild fluctuations with appreciating tendency dominating specially for the effective rates (REER1 I specifically).

The relevance of the real exchange rate fundamentals for the RER movements is by far higher in the post-'Derg' regime than their relevance during the 'Derg'-regime. This is because the highly command economy of the 'Derg'-regime has already begun to be dismantled and market mechanism has started to take place. Therefore, it is imperative to look at how the Ethiopian transitional government's economic policy affects these fundamentals. It is remembered that one of the fundamentals is the share of investment in gross domestic product (GDP) and has got an appreciating impact on the equilibrium RER. The transitional period's economic policy of Ethiopia indicates that in order to encourage private capital formation, which was negligibly small during the 'Derg' era, the state "... will create enabling conditions for the

participation of both domestic and foreign private capital in various economic activities without any capital limitation, and provides incentives and encourages to promote domestic capital participation; encourage a wider participation of private foreign capital."²⁰

Capital inflow is also another RER fundamental that has got an impact on the RER behaviour. The transitional period's economic policy indicates that "the government will have to secure substantial external resources and channel them effectively for economic reconstruction in a coordinated manner. Securing external support will, therefore, be a major aspect of the country's foreign policy objectives."²¹ In light of sections 5.1 and 5.2 it is reasonable to expect that the RER will appreciate due to this massive inflow of capital, if it succeeds and other counteracting forces like reduction of government consumption, increase in real GDP, reduction of government deficit, etc. are not there.

The transitional period's economic policy also states facts like replacement of quantitative restriction by tariffs as far as external trade is concerned. The effect of this should also be seen. From the past experience it is shown in the previous two sections that the increasing trend of the exchange control measured by the implicit import tariff rate was associated with a decreasing trend in the real exchange rates (appreciation). It should be suspected that such a

thing will appear in the future unless counteracting forces are injected.

The transitional government of Ethiopia has also planned to broaden the credit and savings facilities of state financial institutions. If the demand for credits does not grow proportionately it means that excess supply for credits is going to persist and this has got an appreciating impact on the real exchange rate.

On the other hand, it is stated in the policy that measures are to be taken to achieve fiscal balance (that is, to reduce government deficit to a sizable level). The government is trying to increase the rate of growth of GDP. Such measures have got positive impacts on the real exchange rate (depreciation of the RER). As to where one is going, as far as the RER is concerned, therefore, depends on where the balance strikes.

As far as the actual changes on two of these fundamentals are concerned an internal source of the Ministry of Planning and Economic Development (MOPED) indicates that the following trends are observed.

Table 5.3.2

Indicators of Recent Changes in Some of the RER Fundamentals

Year	GCGDP	INVGDP
1990/91	0.215	<u>0.104</u>
1991/92	0.157	0.088
1992/93	0.167	0.160
1993/94	0.187	0.218
1994/95	0.187	0.229

Source: MOPED; unpublished.

Beginning from 1991/92 these two RER fundamentals are showing increasing tendencies which may force the equilibrium RER to appreciate. There are also some internal sources from the policy analysis unit of MOPED which indicate that the share of government deficit in the high powered money is rising which also may lead to an equilibrium RER appreciation.

CHAPTER SIX

SUMMARY, CONCLUSIONS, AND POLICY RECOMMENDATIONS.

6.1 Summary

The systematic analysis of the behaviours and dynamics of the real exchange rates of the 'Birr' done in this thesis started from defining the concept of the real exchange rate itself. Four varieties of the concept are constructed and their behaviours studied. These four varieties are the multilateral purchasing power parity variety, which is defined as the nominal exchange rate of the Birr against major currencies adjusted by consumer price ratios between the major Ethiopian trade partners and Ethiopia and taking trade shares as weights in the process of adjustment; the multilateral salter-swan approach variety, which is defined as the nominal exchange rates of the Birr against the major currencies adjusted by the ratios of whole sale prices of trade partners to the consumer prices of Ethiopia and taking the same trade shares as weights in the process of adjustment; and the corresponding bilateral rates defined against the US dollar.

In the first three chapters the research problem, the measurement and definitional issues, and survey of the literatures on the real exchange rate (both theoretical and empirical) are presented. The next two chapters (that is, chapters four and five) deal with the behaviour and dynamics

of the RERS of the 'Birr' and their significance. The final chapter (that is chapter six) concludes the paper.

In chapter one it is stated that the study of the question of why the real exchange rate moves have many times attracted the attention of policy makers and academics. This same attracted the attention of policy makers and academics. This same attraction gave rise to the writing of this paper and in this same chapter the research problem is formally stated; the objectives and significance of the study are listed; and the methodologies used for data collection and analysis are explained.

In chapter two the measurement and definitional issues are presented. Therein, the diversity of the definition of the RER is explained and these diverse ways are categorized into two, namely the purchasing power parity and the Salter - Swan approach, and these two are formally defined. It is also stated that in whichever way may we define the RER, there are at least two ways of looking at it, namely the multilateral aspect and the bilateral aspect. Besides the definitional issues, the problems faced in measuring the components of the RER (that is the nominal exchange rates, the consumer and whole sale prices, and the trade shares) and the RER fundamentals are presented in this same chapter.

Chapter three is a partial review of the literature on the RER dynamics and behaviours. it captures some of the main

theoretically and empirically established facts about the behaviours of the real exchange rate especially in developing countries.

Based on the background information about real Exchange rate behaviours obtained and the definitions and statement of the problem covered in chapters one through three, the cases of the RERs of the 'Birr' are investigated in chapters four and five. In chapter four the behaviour and the dynamics of the RER of the 'Birr' is explained. The variability and trends of the four indexes and the relationships between the four indexes are explained in this chapter. The dynamic interactions between the various RER indexes, on the one hand, and the RER fundamentals on the other are also included in this same chapter.

Chapter five discloses some of the structural characteristics of the Ethiopian economy in the past and gives some highlights on how these characteristics affect the RERs. It goes back to the period 1960 up to 1973, in which market forces were operating, and based on the then's observation the chapter tries to derive some lessons into the future (that is into the post-1991 period).

6.2 Conclusions

The paper has arrived at the following general conclusions:

- (1) Both the two effective and the two bilateral RER indexes have shown highly fluctuating characteristics which signifies that there is no predictability of international competitiveness of the country;
- (2) In terms of variability, the Salter-Swan definition of the effective real exchange rate (REER1) shows severity and thus policy makers must give greater emphasis to it;
- (3) All the four real exchange rate indexes and the six real exchange rate fundamentals are non-stationary whereas their first differences are not. This gives us the conclusion that there is a co-integration relationship between the individual RER indexes, on the one hand and all the RER fundamentals on the other;
- (4) Both the co-integration and the error correction regressions indicate that most of the RER fundamentals are individually insignificant in explaining the RER movements while they are jointly significant;
- (5) The statistical relationships between the various indexes show us that whether we take the effective rate or the bilateral rate in diverting

macroeconomic policy directions has no significant difference;

- (6) Not all the RER fundamentals do affect the RER indexes in a similar fashion. TOT, GCGDP, and INVGDP, synonymously affect all the four indexes negatively. EXCRE affects all the four indexes positively. EXCON affects REER2I and RERus2I negatively whereas it affects REER1I and RERus1I positively. But, DEH affects REER2I and RERUS 1I negatively and REER1I and RERUS2I positively; and
- (7) The RER of the Birr has always been misaligned. Though it may not have practical value, however, the average level of misalignment over the period 1960 up to 1991 has been zero. The last years of the Derg regime, however, indicate very high levels of misalignment (over valuation of the actual RER).

6.3 Policy Recommendations

Based on the results obtained in this thesis the following policy recommendations are sensible:

If the government considers the improvement of the level of international competitiveness of Ethiopia is essential, then:

- (1) expansive investment and government consumption policies must be checked and a brake on the expansive tendency of these variables must be put on and the expansion must be adjusted with GDP's growth level;
- (2) the terms of trade deteriorating tendency of the country must be counteracted through, for example, diversifying exports and moving towards the exports goods which fetch higher prices in the world market;
- (3) The government must expand the level of credit (see conclusion numbers six above).

NOTES

1. On these issues see [45] pp 4-15.
2. Edwards S. [18] P. 48.
3. For example, Groot W.A. [25] and Edwards S. [18].
4. For the question of what w_{ij} , e_{ij} , p_{jt} and p_{it} are, please look at section 2.2. There is no any standard way of selecting these components. They are to be chosen by the analyst concerned.
5. Devarajan S., et al. [13], P. 45.
6. Edwards S. [18]; p.51.
7. Ibid, P. 9.
8. Examples include Michael Mussa [43], Maurice Obstfeld [44], Arnold C. Harberger [26], and Edwards S. [18 and 19].
9. Balassa B. [5], P. 192.
10. Ibid, pp 191 - 192.
11. Edwards S., op. cit. P. 3.
12. Ibid P. 51.
13. Edwards S. [19] in Classen M.E. (ed.) "Exchange Rate Policies in Developing countries", MIT Press, 1991, P. 253.
14. Ibid P.256.
15. Ibid P.257.
16. Ibid P.257.
17. For the sake of curiosity one can consult Edwards S.[19].
18. The method of averages used to calculate trend coefficients is as follows: The period under

consideration will be divided into two equal parts. Then time will be given to the values 1 up to N, where N is the number of observations in the series. Then, the following two straight line equations will be solved simultaneously to obtain the respective trend coefficients (=b):

1) $\sum x_i = N/2 * a + b \sum t_i$, where the summation extends from $i=1$ to $N/2$.

2) $\sum x_i = N/2 * a + b \sum t_i$, where the summation extends from $i=N/2 + 1$ to N ; Where x is the time series variable; t is time which runs from 1 to N . [For further reading one can consult Hawkins A.C. and Weber E.J.- "STATISTICAL ANALYSIS, Applications to Business and Economics", Harper and Row Publishers, New York, 1980, pp 34-35.

19. Notice that the trend coefficients are the rates of changes of the real exchange rate indexes with respect to time and thus are real appreciation and depreciation as the case may be.

20. TGE[50], P.18

21. Ibid., p.18

APPENDICES

APPENDIX I

NOMINAL EXCHANGE RATES OF THE 'BIRR' AGAINST THE
CURRENCIES OF ETHIOPIAN MAJOR TRADE PARTNERS.

YEAR	BELGIUM	CHINA	FINLAND P1 CANADA P2	FRANCE	GERMANY	GREECE P1 KOREA P2
1960	0.050	0.062	0.775	0.507	0.596	0.083
1961	0.050	0.062	0.772	0.507	0.622	0.083
1962	0.050	0.062	0.771	0.507	0.621	0.083
1963	0.050	0.062	0.776	0.509	0.629	0.083
1964	0.050	0.062	0.776	0.510	0.629	0.083
1965	0.050	0.062	0.776	0.509	0.624	0.083
1966	0.050	0.062	0.776	0.505	0.629	0.083
1967	0.050	0.062	0.776	0.509	0.625	0.083
1968	0.050	0.062	0.595	0.505	0.625	0.083
1969	0.050	0.062	0.595	0.449	0.678	0.083
1970	0.050	0.063	0.595	0.453	0.685	0.083
1971	0.470	0.058	0.548	0.441	0.705	0.076
1972	0.052	0.058	0.553	0.449	0.719	0.076
1973	0.053	0.054	0.541	0.439	0.766	0.069
1974	0.053	1.055	2.117	0.430	0.799	0.005
1975	0.056	1.113	2.035	0.483	0.841	0.004
1976	0.054	1.066	2.099	0.433	0.822	0.004
1977	0.058	1.114	1.946	0.421	0.892	0.004
1978	0.066	1.229	1.815	0.459	1.031	0.004
1979	0.071	1.331	1.767	0.487	1.129	0.004
1980	0.071	1.381	1.770	0.489	1.139	0.003
1981	0.056	1.214	1.727	0.381	0.916	0.003
1982	0.045	1.094	1.678	0.315	0.853	0.003
1983	0.040	1.048	1.679	0.272	0.811	0.003
1984	0.036	0.892	1.598	0.237	0.727	0.003
1985	0.035	0.705	1.516	0.230	0.703	0.002
1986	0.046	0.599	1.489	0.299	0.953	0.002
1987	0.055	0.556	1.561	0.344	1.152	0.003
1988	0.056	0.558	1.682	0.347	1.179	0.003
1989	0.053	0.549	1.748	0.324	1.101	0.003
1990	0.062	0.433	1.774	0.380	1.281	0.003
1991	0.061	0.389	1.807	0.367	1.247	0.003

APPENDIX I [CONTD.]

YEAR	IRAN P1 SAUDI P2	ISRAEL	ITALY	JAPAN	NETHERLANDS	SWEDEN
1960	0.033	1.380	0.004	0.007	0.659	0.479
1961	0.033	1.380	0.004	0.007	0.690	0.479
1962	0.033	0.828	0.004	0.007	0.690	0.479
1963	0.033	0.833	0.004	0.007	0.694	0.481
1964	0.033	0.833	0.004	0.007	0.696	0.486
1965	0.033	0.833	0.004	0.007	0.692	0.483
1966	0.033	0.833	0.004	0.007	0.692	0.483
1967	0.033	0.714	0.004	0.007	0.695	0.484
1968	0.033	0.714	0.004	0.007	0.693	0.483
1969	0.033	0.714	0.004	0.007	0.691	0.484
1970	0.033	0.714	0.004	0.007	0.691	0.483
1971	0.030	0.617	0.004	0.007	0.658	0.450
1972	0.030	0.548	0.004	0.008	0.718	0.484
1973	0.030	0.493	0.003	0.007	0.740	0.474
1974	0.583	0.414	0.002	0.007	0.769	0.466
1975	0.588	0.345	0.003	0.007	0.818	0.499
1976	0.586	0.259	0.002	0.007	0.783	0.475
1977	0.587	2.070	0.002	0.007	0.843	0.462
1978	0.609	1.035	0.002	0.009	0.957	0.458
1979	0.616	0.690	0.002	0.009	1.032	0.483
1980	0.622	0.414	0.002	0.009	1.041	0.489
1981	0.612	0.188	0.001	0.009	0.829	0.409
1982	0.604	0.086	0.001	0.008	0.775	0.329
1983	0.599	0.036	0.001	0.009	0.725	0.269
1984	0.587	0.007	0.001	0.009	0.645	0.250
1985	0.572	0.002	0.001	0.009	0.623	0.241
1986	0.553	1.391	0.001	0.012	0.944	0.291
1987	0.553	1.298	0.001	0.014	1.165	0.327
1988	0.553	1.295	0.001	0.016	1.035	0.338
1989	0.553	1.080	0.001	0.015	1.081	0.321
1990	0.553	1.027	0.001	0.014	1.225	0.349
1991	0.553	0.908	0.001	0.015	1.210	0.342

APPENDIX I [CONTD.]

YEAR	UK	US	YUGOZLAVIA	INDIA P1 KUWAIT P2	SWITZERLAND
1960	5.181	2.484	0.393	0.520	0.577
1961	6.977	2.484	0.331	0.521	0.576
1962	6.958	2.484	0.331	0.520	0.575
1963	7.003	2.500	0.333	0.523	0.579
1964	6.983	2.500	0.333	0.518	0.579
1965	7.003	2.500	0.200	0.526	0.579
1966	6.977	2.500	0.200	0.328	0.578
1967	6.019	2.500	0.200	0.331	0.578
1968	5.964	2.500	0.200	0.328	0.581
1969	5.999	2.500	0.200	0.331	0.579
1970	5.999	2.500	0.200	0.333	0.572
1971	5.606	2.303	0.154	0.307	0.557
1972	5.762	2.303	0.136	0.303	0.603
1973	5.076	2.070	0.128	0.267	0.654
1974	4.872	2.070	N.A.	7.065	0.695
1975	4.599	2.070	N.A.	7.163	0.802
1976	3.739	2.070	N.A.	7.089	0.828
1977	3.613	2.070	N.A.	7.213	0.861
1978	3.973	2.070	N.A.	7.527	1.158
1979	4.392	2.070	N.A.	7.500	1.245
1980	4.815	2.070	N.A.	7.667	1.235
1981	4.198	2.070	N.A.	7.419	1.054
1982	3.624	2.070	N.A.	7.188	1.019
1983	3.140	2.070	N.A.	7.113	0.986
1984	2.766	2.070	N.A.	6.993	0.881
1985	2.683	2.070	N.A.	6.877	0.843
1986	3.037	2.070	N.A.	7.113	1.151
1987	3.393	2.070	N.A.	7.419	1.388
1988	3.687	2.070	N.A.	7.419	1.415
1989	3.394	2.070	N.A.	7.041	1.265
1990	3.694	2.070	N.A.	N.A.	1.490
1991	3.663	2.070	N.A.	7.289	1.444

NOTES: N.A.= NOT AVAILABLE.

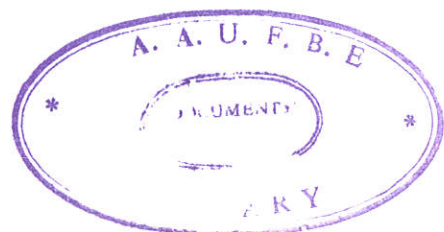
* =P1 and P2 REFER TO PERIOD 1[1960-1973],and PERIOD 2 [1974-1991],RESPECTIEVELY.

SOURCES: IMF;"INERNATIONAL FINANCIAL STATISTICS"(VARIOUS YEARS)

APPENDIX II

CONSUMER PRICE INDEXES [CPI's] OF ETHIOPIA AND HER
MAJOR TRADE PARTNERS (1963=100 for P1 & 1985=100 for P2).

YEAR	BELGIUM	CHINA	FINLAND P1 CANADA P2	FRANCE	GERMANY	GREECE P1 KOREA P2
1960	96.20	88.50	89.70	87.90	91.90	95.40
1961	97.20	95.30	91.50	91.20	94.60	97.30
1962	98.10	97.90	94.90	95.20	97.30	97.30
1963	100.00	100.00	100.00	100.00	100.00	100.00
1964	104.70	100.00	110.30	103.20	102.70	100.90
1965	108.40	99.80	116.00	105.60	105.60	103.80
1966	112.90	101.90	120.00	108.80	109.50	109.10
1967	116.20	105.20	127.00	92.60	111.40	110.90
1968	119.40	111.80	138.00	96.80	113.10	111.30
1969	123.80	117.40	141.00	102.70	116.10	114.00
1970	128.70	121.70	145.00	108.80	120.50	117.50
1971	134.30	124.80	154.00	114.80	126.70	121.00
1972	141.60	128.70	165.50	121.50	134.00	126.30
1973	151.50	139.30	182.90	130.50	143.30	145.90
1974	46.40	71.50	41.50	34.60	63.90	25.60
1975	52.30	71.80	46.00	38.60	67.70	32.00
1976	57.10	72.00	49.40	42.30	70.70	36.90
1977	61.10	73.90	53.40	46.30	73.20	40.70
1978	63.90	74.40	58.10	50.50	75.30	46.60
1979	66.70	75.80	63.50	55.90	78.40	55.10
1980	71.20	81.50	69.90	63.40	82.60	70.90
1981	76.60	83.60	78.60	71.80	87.90	86.10
1982	83.30	85.30	87.10	80.30	92.50	92.20
1983	89.70	87.00	92.20	88.10	95.50	95.40
1984	95.40	89.40	96.20	94.60	97.90	97.60
1985	100.00	100.00	100.00	100.00	100.00	100.00
1986	101.30	107.00	104.20	102.50	99.90	102.80
1987	102.90	116.40	108.70	105.90	100.10	105.90
1988	104.10	140.50	113.10	108.80	101.40	113.50
1989	107.30	163.40	118.70	112.60	104.20	119.90
1990	114.10	165.50	124.40	116.40	107.00	130.20
1991	114.60	173.70	131.40	120.00	110.70	142.80



APPENDIX II [CONTD.]

YEAR	IRAN P1 SAUDI P2	ISRAEL	ITALY	JAPAN	NETHERLANDS	SWEDEN
1960	95.30	80.60	87.20	82.70	91.20	91.30
1961	98.40	86.10	88.90	92.40	92.90	93.00
1962	99.20	93.80	93.20	92.90	95.60	97.40
1963	100.00	100.00	100.00	100.00	100.00	100.00
1964	103.10	105.40	105.90	103.90	105.30	103.50
1965	106.00	113.30	110.30	111.80	111.50	109.00
1966	105.70	122.30	112.80	117.30	117.70	115.00
1967	107.30	124.30	103.30	98.20	101.90	121.00
1968	108.10	126.90	104.70	103.60	105.80	123.00
1969	111.50	129.90	107.50	109.50	113.60	126.00
1970	113.90	138.00	112.80	117.30	117.70	135.00
1971	118.60	154.60	118.20	124.70	126.50	145.00
1972	126.30	174.30	125.00	130.70	136.40	153.80
1973	138.70	209.10	138.50	146.10	147.40	164.60
1974	43.40	0.00	21.10	56.90	55.10	36.00
1975	58.60	0.00	24.78	63.70	60.90	39.50
1976	76.80	0.00	28.80	69.70	66.30	43.50
1977	85.90	0.00	33.70	75.30	70.60	48.50
1978	94.90	0.00	37.80	78.10	73.40	53.40
1979	96.90	0.00	43.40	80.90	76.50	57.20
1980	101.00	0.00	52.60	87.40	81.50	65.00
1981	104.00	1.00	61.90	91.70	86.90	72.90
1982	105.00	2.00	72.10	94.10	92.10	79.20
1983	105.00	5.00	82.70	95.80	94.70	86.20
1984	103.00	25.00	91.60	97.90	97.80	93.10
1985	100.00	100.00	100.00	100.00	100.00	100.00
1986	96.90	145.00	105.80	100.60	101.30	104.20
1987	94.90	172.00	110.80	100.70	105.10	108.60
1988	95.90	202.00	116.50	101.40	107.80	114.90
1989	94.90	245.00	123.80	103.70	112.00	122.30
1990	96.90	273.00	131.70	106.90	116.20	135.10
1991	101.00	317.00	140.10	110.40	120.80	147.80

APPENDIX II [CONTD.]

YEAR	INDIA P1 KUWAIT P2	US	UK	YUGOZLAVIA	ETHIOPIA	SWITZERLAND
1960	92.20	96.20	90.20	80.00	95.20	90.90
1961	93.90	97.20	92.90	86.40	95.20	92.80
1962	96.60	99.10	97.30	95.00	98.10	96.40
1963	100.00	100.00	100.00	100.00	100.00	100.00
1964	112.10	100.90	102.70	111.00	101.90	102.70
1965	124.00	102.80	108.00	150.00	129.00	106.60
1966	137.00	105.70	112.50	184.00	125.20	111.70
1967	156.00	90.90	95.90	199.00	127.80	116.20
1968	160.00	94.70	100.40	209.00	128.00	118.90
1969	160.00	99.80	105.80	229.00	129.80	121.90
1970	169.00	105.70	112.50	248.00	143.00	126.30
1971	174.00	110.20	123.10	284.00	143.70	134.60
1972	184.00	113.80	131.90	230.00	135.00	143.60
1973	216.20	120.90	144.00	397.00	147.00	156.10
1974	51.50	45.80	29.10	N.A.	31.40	67.70
1975	55.90	50.00	36.20	N.A.	33.40	72.20
1976	58.80	52.90	42.10	N.A.	42.90	73.50
1977	64.60	56.40	48.90	N.A.	50.10	74.40
1978	70.20	60.70	52.80	N.A.	57.20	75.20
1979	75.20	67.50	59.90	N.A.	66.40	77.90
1980	80.40	76.60	70.70	N.A.	69.40	81.10
1981	86.30	84.60	79.10	N.A.	73.70	86.30
1982	93.00	89.70	85.90	N.A.	77.80	91.20
1983	97.40	92.60	89.80	N.A.	77.40	93.90
1984	98.50	96.60	94.30	N.A.	83.90	96.70
1985	100.00	100.00	100.00	N.A.	100.00	100.00
1986	101.00	101.90	103.40	N.A.	90.20	100.80
1987	101.60	105.70	107.70	N.A.	88.00	102.20
1988	103.10	109.90	113.00	N.A.	94.20	104.10
1989	106.60	115.20	121.80	N.A.	101.60	107.40
1990	N.A.	121.40	133.40	N.A.	106.80	113.20
1991	N.A.	126.60	141.20	N.A.	145.00	119.80

NOTES: N.A. = NOT AVAILABLE.

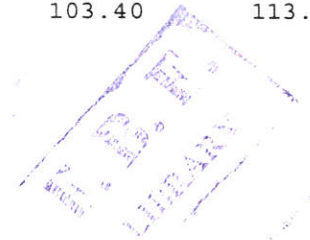
* =P1 and P2 REFER TO PERIOD 1[1960-1973], and PERIOD 2 [1974-1991], RESPECTIEVELY.

SOURCES: IMF; "INTERNATIONAL FINANCIAL STATISTICS" (VARIOUS YEARS)
; "STATISTICAL YEARBOOKS" (VARIOUS YEARS)
; "STATISTICAL ABSTRACTS" (VARIOUS YEARS"

APPENDIX III

WHOLE SALE PRICE INDEXES [WPI's] OF THE ETHIOPIAN
TRADE PARTNERS (1963=100 for P1 & 1985=100 for P2).

YEAR	BELGIUM	CHINA	FINLAND P1 CANADA P2	FRANCE	GERMANY	GREECE P1 KOREA P2
1960	98.10	88.10	102.10	94.00	97.30	94.60
1961	98.10	91.60	98.90	96.70	98.50	96.40
1962	98.10	93.70	97.90	97.60	99.40	95.50
1963	100.00	100.00	100.00	100.00	100.00	100.00
1964	105.80	102.80	104.20	103.80	101.10	104.60
1965	105.60	97.70	106.00	104.30	103.50	108.60
1966	107.40	99.20	107.00	107.30	105.30	112.40
1967	107.10	101.60	112.00	133.90	104.40	111.50
1968	107.6	103.60	129.00	104.60	103.60	111.10
1969	112.60	103.30	135.00	115.90	105.50	113.50
1970	117.70	106.20	140.00	124.70	110.70	117.70
1971	116.50	106.20	147.90	127.10	115.50	122.40
1972	121.20	112.50	160.70	133.00	118.60	129.40
1973	136.50	136.50	188.70	152.60	126.40	160.00
1974	61.50	N.A.	43.30	47.30	70.20	27.40
1975	64.10	N.A.	48.10	42.90	72.70	34.60
1976	67.20	N.A.	50.60	47.00	76.60	38.80
1977	69.00	N.A.	54.60	49.80	77.80	42.30
1978	69.40	N.A.	59.60	51.40	77.70	47.20
1979	72.10	N.A.	68.30	57.80	80.30	56.10
1980	69.10	91.00	77.40	62.10	84.00	77.90
1981	77.60	91.90	85.30	68.90	89.90	93.80
1982	86.30	93.40	90.50	77.00	94.40	98.20
1983	91.70	94.30	93.60	84.80	95.80	98.40
1984	97.30	97.10	97.40	91.90	99.20	99.10
1985	100.00	100.00	100.00	100.00	100.00	100.00
1986	90.90	108.40	100.80	88.80	95.80	98.50
1987	86.90	116.90	103.60	86.90	93.20	99.00
1988	88.00	134.50	108.10	87.60	95.80	101.70
1989	93.00	N.A.	110.30	116.90	99.30	103.20
1990	93.60	N.A.	110.60	103.40	101.00	107.50
1991	92.60	N.A.	109.50	97.90	103.40	113.30



APPENDIX III [CONTD.]

YEAR	IRAN P1 SAUDI P2	ISRAEL	ITALY	JAPAN	NETHERLANDS	SWEDEN
1960	98.10	80.60	92.00	98.80	98.00	91.90
1961	100.00	86.10	92.00	99.80	97.00	96.90
1962	100.00	93.80	95.00	98.10	98.00	89.40
1963	100.00	100.00	100.00	100.00	100.00	100.00
1964	104.70	101.00	102.90	100.00	106.00	115.60
1965	107.30	104.90	104.90	100.90	110.00	133.00
1966	106.20	109.90	106.50	103.20	115.50	118.00
1967	106.50	111.20	106.50	105.10	115.50	110.00
1968	107.00	113.80	106.90	106.00	116.00	125.00
1969	109.40	116.10	110.90	108.40	116.80	154.00
1970	113.60	123.50	119.40	112.30	124.20	125.00
1971	121.60	134.60	123.40	111.40	125.30	128.00
1972	128.40	150.60	128.40	112.30	129.80	136.30
1973	140.90	179.00	150.30	129.90	146.10	151.30
1974	N.A.	0.00	28.10	72.90	57.80	26.00
1975	N.A.	0.00	30.50	75.30	60.90	29.00
1976	N.A.	0.00	37.40	79.10	64.80	29.00
1977	N.A.	15.00	44.10	80.50	67.80	24.00
1978	N.A.	23.00	47.70	78.60	68.10	25.00
1979	N.A.	42.00	51.30	86.10	83.10	22.00
1980	N.A.	100.00	59.7	99.00	80.70	22.00
1981	N.A.	222.00	68.40	100.00	91.20	35.00
1982	N.A.	503.00	77.90	100.90	92.70	46.00
1983	N.A.	122.90	85.10	100.00	93.70	100.00
1984	N.A.	0.00	93.10	100.00	98.70	105.00
1985	N.A.	100.00	100.00	100.00	100.00	100.00
1986	N.A.	145.00	102.10	91.10	89.60	160.00
1987	N.A.	172.00	104.50	87.10	87.90	157.00
1988	N.A.	202.00	109.90	87.10	89.20	166.00
1989	N.A.	245.00	113.30	88.80	100.00	256.00
1990	N.A.	273.00	121.70	90.60	101.00	253.00
1991	N.A.	317.00	128.10	90.80	103.30	242.00

APPENDIX III [CONTD.]

YEAR	UK	US	YUGOZLAVIA	INDIA P1 KUWAIT P2	SWITZERLAND
1960	98.80	100.00	96.20	93.30	87.10
1961	97.70	100.00	100.00	94.90	127.30
1962	97.70	100.00	100.00	96.60	117.50
1963	100.00	100.00	100.00	100.00	100.00
1964	104.10	101.30	105.70	112.60	86.60
1965	105.40	103.10	120.00	122.00	72.90
1966	108.00	106.00	134.00	138.00	62.50
1967	107.50	109.10	137.00	160.00	63.70
1968	117.30	113.60	137.00	158.00	91.00
1969	121.40	119.70	140.00	164.90	108.70
1970	128.20	126.80	155.00	158.70	111.10
1971	134.10	132.30	179.00	173.00	113.30
1972	140.00	136.60	198.50	187.30	117.80
1973	184.70	145.10	224.80	223.80	130.00
1974	37.80	60.00	N.A.	64.40	55.30
1975	44.20	64.90	N.A.	69.20	49.60
1976	53.70	68.20	N.A.	74.50	54.80
1977	63.30	72.60	N.A.	79.70	57.60
1978	67.20	78.10	N.A.	78.80	55.50
1979	70.40	86.70	N.A.	83.90	61.40
1980	76.90	94.80	N.A.	92.70	58.20
1981	85.00	100.90	N.A.	99.00	53.00
1982	91.50	100.00	N.A.	100.10	52.20
1983	96.20	101.90	N.A.	101.90	67.50
1984	99.20	104.30	N.A.	101.30	76.90
1985	100.00	100.00	N.A.	100.00	100.00
1986	103.50	106.20	N.A.	100.60	121.80
1987	106.50	108.10	N.A.	103.90	126.10
1988	109.60	112.80	N.A.	108.70	119.00
1989	108.80	119.00	N.A.	118.20	145.40
1990	112.70	126.00	N.A.	N.A.	137.50
1991	112.90	133.10	N.A.	N.A.	138.80

NOTES: N.A.= NOT AVAILABLE.

* =P1 and P2 REFER TO PERIOD 1[1960-1973], and PERIOD 2 [1974-1991], RESPECTIEVELY.

SOURCES: IMF; "INTERNATIONAL FINANCIAL STATISTICS" (VARIOUS YEARS)
UN ; "STATISTICAL YEARBOOK", 1974

APPENDIX IV

AVERAGE TRADE SHARES OF THE MAJOR TRADE PARTNERS OF ETHIOPIA.

	PERIOD 1 [1960-1973]	PERIOD 2 [1974-1991]
BELGIUM	0.011	0.016
CHINA	0.011	0.009
CANADA	-	0.019
FINLAND	0.014	-
FRANCE	0.038	0.039
GERMANY	0.100	0.112
GREECE	0.007	-
INDIA	0.011	-
IRAN	0.022	-
ISRAEL	0.012	0.010
ITALY	0.139	0.103
JAPAN	0.092	0.077
KOREA	-	0.019
KUWAIT	-	0.029
ETHERLANDS	0.033	0.026
SAUDI ARABIA	-	0.029
SWEDEN	0.011	0.015
WITZERLAND	0.009	0.016
UK	0.069	0.056
US	0.268	0.127
UGOZLAVIA	0.014	-
TOTAL	0.861	0.702

SOURCE: IMF; "DIRECTION OF TRADE STATISTICS" (VARIOUS YEARS).

APPENDIX V

UNIT ROOT TESTS FOR THE TEN VARIABLES CONSIDERED
(For sample size of 31 and 30 for DF and ADF respectively)

Variable	I	DF		I	ADF (1)	
		With trend	Without trend		With trend	Without trend
REER2	I	-2.57 (-3.56)	-1.90 (-2.95)	I	-2.74 (-3.56)	-2.18 (-2.96)
REER1	I	-2.04 (-3.56)	-1.28 (-2.95)	I	-2.39 (-3.56)	-1.72 (-2.96)
RERus2	I	-2.64 (-3.56)	-2.70 (-2.95)	I	-2.81 (-3.56)	-2.85 (-2.96)
RERus1	I	-2.36 (-3.56)	-2.30 (-2.95)	I	-2.12 (-3.56)	-2.05 (-2.96)
TOT		-2.76 (-3.56)	-2.81 (-2.95)		-2.66 (-3.56)	-2.72 (-2.96)
EXCON		-2.94 (-3.56)	-2.24 (-2.95)		-2.75 (-3.56)	-1.86 (-2.96)
GCGDP		-2.49 (-3.56)	-0.08 (-2.95)		-2.7 (-3.56)	-0.52 (-2.96)
EXCRE		-3.16 (-3.56)	-3.09 (-2.95)		-3.18 (-3.56)	-3.10 (-2.96)
DEH		-4.96 (-3.56)	-2.78 (-2.95)		-3.37 (-3.56)	-1.79 (-2.96)
INVGDP		-1.53 (-3.56)	-1.7 (-2.95)		-1.69 (-3.56)	-1.76 (-2.96)

Note: Values in parentheses are 95 percent confidence intervals.

Source : Calculated from the series of respective variables.

APPENDIX VI

UNIT ROOT TESTS FOR THE FIRST DIFFERENCES OF THETEN VARIABLES CONSIDERED
(For sample size of 31 and 30 for DF and ADF respectively)

Variable	I	DF		I	ADF(1)	
		With trend	Without trend		With trend	Without trend
DREER2	I	-5.30 (-3.56)	-5.38 (-2.95)	I	-3.91 (-3.56)	-4.00 (-2.96)
DREER1	I	-4.91 (-3.56)	-4.92 (-2.95)	I	-3.89 (-3.56)	-3.89 (-2.96)
DRERus2	I	-5.45 (-3.56)	-5.57 (-2.95)	I	-4.13 (-3.56)	-4.24 (-2.96)
DRERus1	I	-5.59 (-3.56)	-6.01 (-2.95)	I	-4.69 (-3.56)	-4.64 (-2.96)
DTOTI		-5.91 (-3.56)	-6.00 (-2.95)		-4.81 (-3.56)	-4.87 (-2.96)
DEXCONI		-5.98 (-3.56)	-5.91 (-2.95)		-4.52 (-3.56)	-4.40 (-2.96)
DGCGDPI		-4.20 (-3.56)	-4.39 (-2.95)		-3.64 (-3.56)	-3.78 (-2.96)
DEXCREI		-5.82 (-3.56)	-5.93 (-2.95)		-5.46 (-3.56)	-5.56 (-2.96)
DDEHI		-8.84 (-3.56)	-8.99 (-2.95)		-5.60 (-3.56)	-5.70 (-2.96)
DINVGDP		-4.26 (-3.56)	-4.31 (-2.95)		-2.95 (-3.56)	-2.98 (-2.96)

Note: Values in parentheses are 95 percent confidence intervals.

Source : Calculated from the series of respective variables.

APPENDIX VII

UNIT ROOT TESTS FOR THE ERROR TERMS OBTAINED
 FROM REGRESSION EQUATIONS 4.1.1 TO 4.1.3
 (For sample size of 31 and 30 for DF and ADF respectively)

Variable	DF		ADF(1)	
	With trend	Without trend	With trend	Without trend
ERR1	-2.59(-3.56)	-1.96(-2.95)	-2.81(-3.56)	-2.29(-2.96)
ERR2	-2.04(-3.56)	-1.28(-2.95)	-2.39(-3.56)	-1.72(-2.96)
ERR3	-2.74(-3.56)	-2.79(-2.95)	-2.81(-3.56)	-2.84(-2.96)

Note: values in parentheses are 95 percent confidence intervals.

Err1 is error term obtained from equation 4.1.1

Err2 is error term obtained from equation 4.1.2

Err3 is error term obtained from equation 4.1.3

Source: Calculated from the series of the variables.

APPENDIX VIII

PROXIES OF THE RER MISALIGNMENTS MEASURED BY

I	YEAR	I	Residuals from regression equations			I
			4.1.1	4.1.2	4.1.3	
I	1960	I	-9.63	I -8.73	I -6.19	I
I	1961	I	2.78	I 2.52	I -0.54	I
I	1962	I	8.15	I 5.47	I 6.89	I
I	1963	I	6.30	I 1.81	I 0.04	I
I	1964	I	0.21	I -6.42	I -1.04	I
I	1965	I	3.91	I -4.49	I 2.83	I
I	1966	I	11.03	I 4.22	I 11.44	I
I	1967	I	-12.79	I -9.79	I -12.99	I
I	1968	I	-14.83	I -9.43	I -15.08	I
I	1969	I	-11.20	I -6.85	I -12.43	I
I	1970	I	0.25	I 1.81	I 3.67	I
I	1971	I	-6.68	I -8.69	I -8.05	I
I	1972	I	2.97	I 3.35	I -2.25	I
I	1973	I	-0.52	I 4.51	I -2.09	I
I	1974	I	9.52	I 13.09	I 19.71	I
I	1975	I	11.53	I 15.42	I 13.11	I
I	1976	I	-0.73	I 4.74	I 5.03	I
I	1977	I	-1.73	I 1.52	I 0.37	I
I	1978	I	-5.65	I -10.48	I -7.89	I
I	1979	I	3.98	I 4.11	I 0.14	I
I	1980	I	10.73	I 12.72	I 4.81	I
I	1981	I	-1.35	I -1.92	I -1.93	I
I	1982	I	-2.08	I -8.67	I -10.23	I
I	1983	I	7.26	I 8.98	I 13.38	I
I	1984	I	-8.36	I -5.02	I -1.18	I
I	1985	I	-16.23	I -15.20	I -8.19	I
I	1986	I	4.99	I 7.98	I 9.88	I
I	1987	I	9.25	I 9.72	I 10.84	I
I	1988	I	12.37	I 15.87	I 6.79	I
I	1989	I	9.22	I 6.96	I -2.80	I
I	1990	I	-5.09	I -5.58	I -0.85	I
I	1991	I	-17.57	I -23.49	I -15.19	I

Source: Equations 4.1.1 through 4.1.3

APPENDIX IX

DETERMINANTS OF THE RER OF THE "BIRR"

I	YEAR	I	I	I	I	I	I	I	I
I	I	EXCON	TOT	GCGDP	EXCRE	DEH	INVGDP	I	I
I	1960	I 0.13	x 94.5	I 0.09	x 23.00	I x 2.9	I x 9.60	I	I
I	1961	I 0.17	x 93.3	I 0.08	x 21.20	I 2.00	I 11.90	I	I
I	1962	I 0.18	x 92.0	I 0.08	x 19.30	I 0.00	I 12.60	I	I
I	1963	I 0.18	x 90.8	I 0.09	18.80	I 6.70	I 12.60	I	I
I	1964	I 0.31	x 89.6	I 0.09	28.00	I 1.50	I 13.10	I	I
I	1965	I 0.31	89.30	I 0.11	5.00	I 8.40	I 13.20	I	I
I	1966	I 0.31	100.00	I 0.11	3.90	I 5.20	I 14.00	I	I
I	1967	I 0.31	84.70	I 0.11	10.90	I 10.40	I 14.30	I	I
I	1968	I 0.28	76.30	I 0.11	13.90	I 5.50	I 13.90	I	I
I	1969	I 0.25	75.60	I 0.10	11.60	I 7.50	I 13.30	I	I
I	1970	I 0.28	100.00	I 0.09	-2.70	I 8.10	I 11.40	I	I
I	1971	I 0.27	74.10	I 0.09	1.00	I 9.80	I 11.70	I	I
I	1972	I 0.26	61.10	I 0.11	1.50	I 6.10	I 12.60	I	I
I	1973	I 0.32	90.80	I 0.11	0.30	I 4.10	I 11.30	I	I
I	1974	I 0.32	88.90	I 0.11	20.80	I 19.70	I 9.80	I	I
I	1975	I 0.26	82.20	I 0.13	25.90	I 22.90	I 10.40	I	I
I	1976	I 0.26	142.70	I 0.14	20.80	I 15.80	I 8.50	I	I
I	1977	I 0.33	199.10	I 0.15	24.20	I 25.10	I 8.20	I	I
I	1978	I 0.31	132.20	I 0.17	23.20	I 13.50	I 7.50	I	I
I	1979	I 0.26	132.80	I 0.16	7.80	I 18.00	I 8.70	I	I
I	1980	I 0.18	100.80	I 0.16	3.70	I 14.10	I 9.90	I	I
I	1981	I 0.21	84.30	I 0.17	13.00	I 18.60	I 10.60	I	I
I	1982	I 0.17	89.70	I 0.18	12.90	I 44.40	I 12.00	I	I
I	1983	I 0.16	91.70	I 0.20	1.90	I 18.40	I 12.70	I	I
I	1984	I 0.15	102.10	I 0.19	11.70	I 22.40	I 15.90	I	I
I	1985	I 0.16	100.00	I 0.19	8.00	I 18.10	I 15.50	I	I
I	1986	I 0.13	112.30	I 0.19	1.30	I 14.30	I 14.30	I	I
I	1987	I 0.18	85.70	I 0.19	6.60	I 14.60	I 15.80	I	I
I	1988	I 0.19	105.10	I 0.24	9.90	I x 23.3	I 15.80	I	I
I	1989	I 0.17	91.60	I 0.26	14.10	I x 23.7	I 13.40	I	I
I	1990	I 0.24	72.40	I 0.27	8.90	I x 24.2	I 12.40	I	I
I	1991	I x 0.	x 81.9	I 0.24	x 3.30	I x 24.6	I 10.40	I	I

SOURCES: (1) IMF; "INTERNATIONAL FINANCIAL STATISTICS" (various ye
(2) CENTRAL STATISTICAL AUTHORITY OF ETHIOPIA.

NOTE: x = extrapolated figures.

FIGURES

Fig 4.1

EFFECTIVE RER INDEXES.

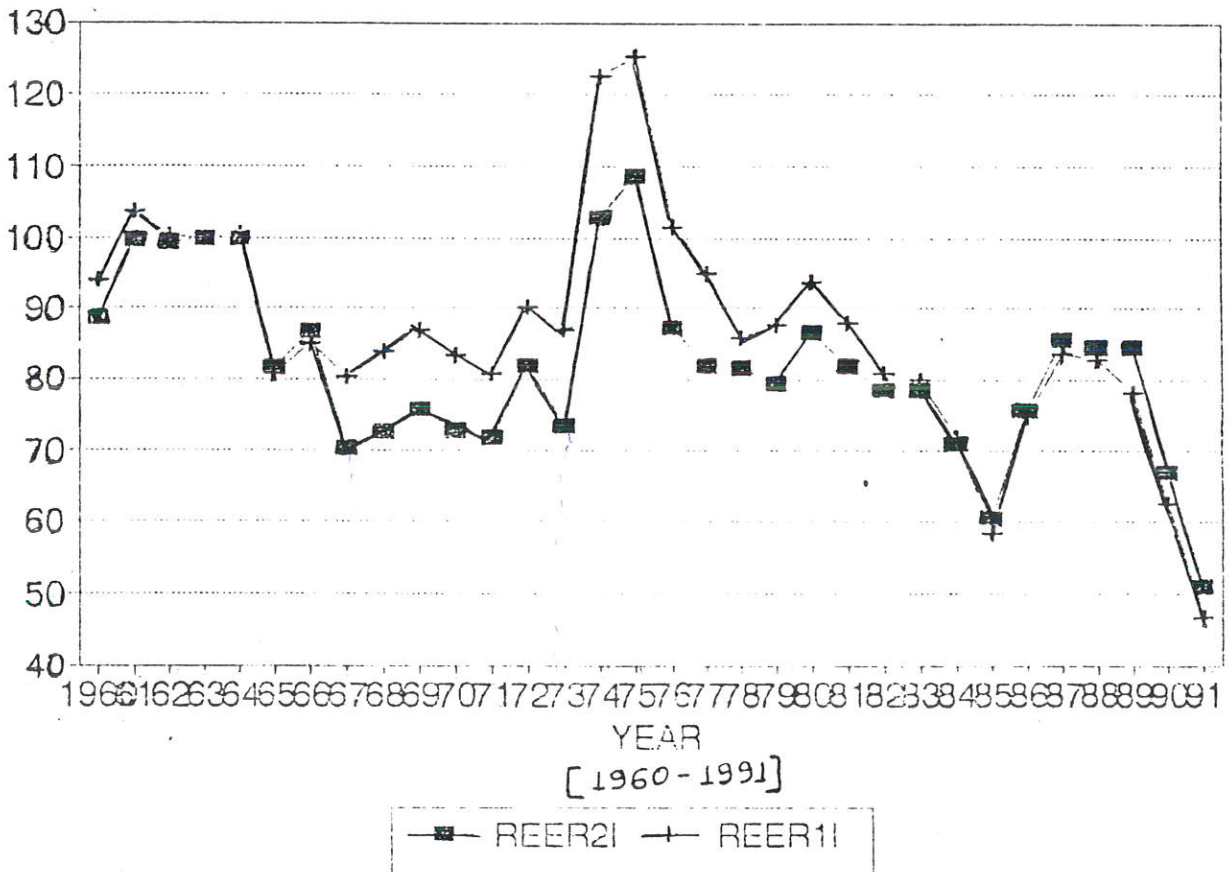


Fig. 4.2

BILATERAL RER INDEXES. WITH THE US

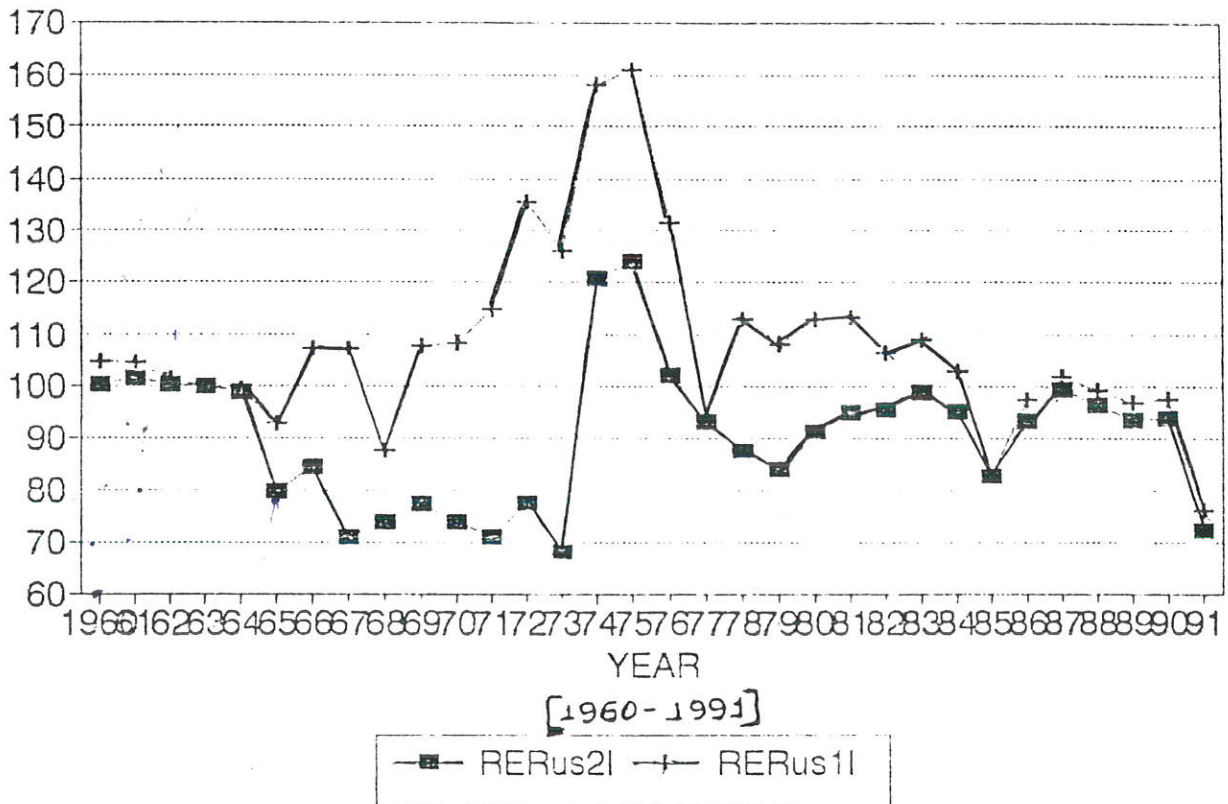


Fig. 4.3

RER FUNDAMENTALS

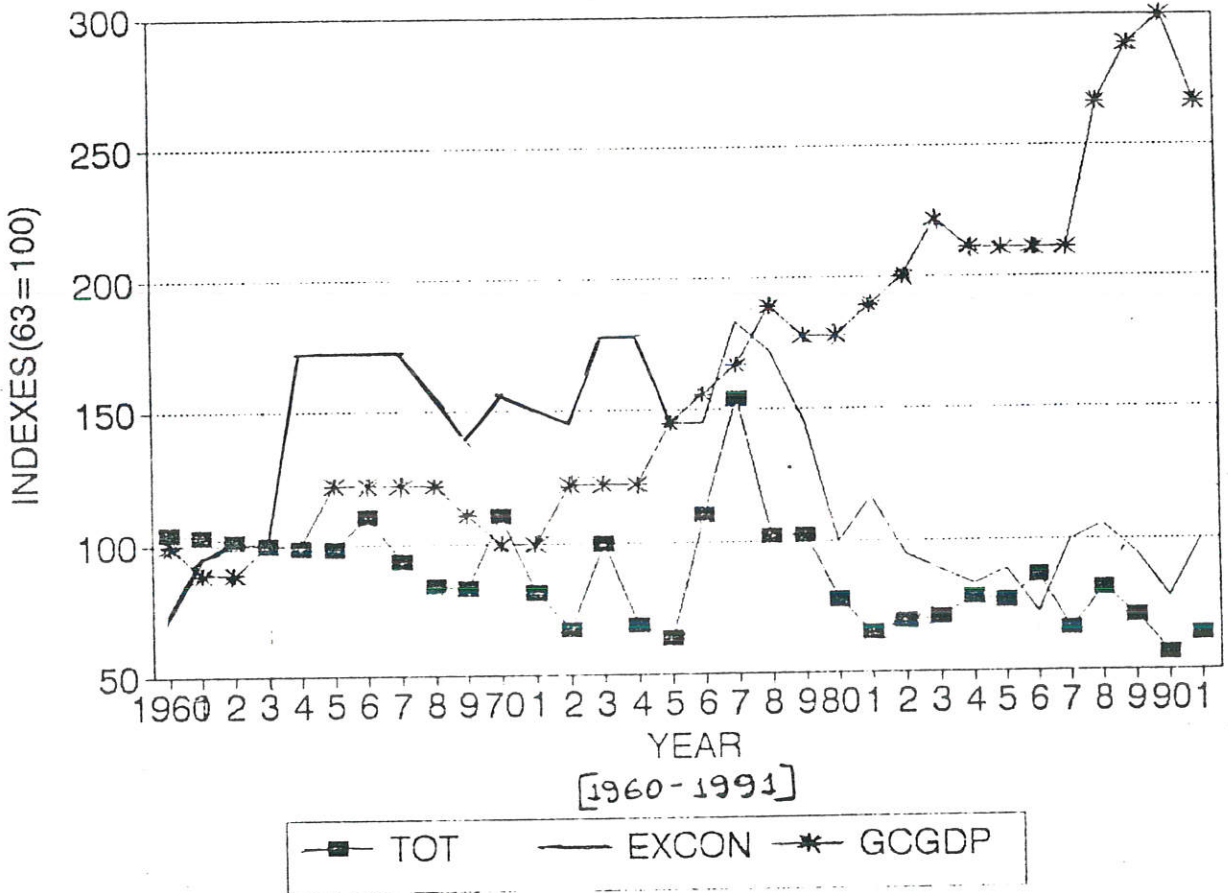


Fig. 4.4

RER FUNDAMENTALS

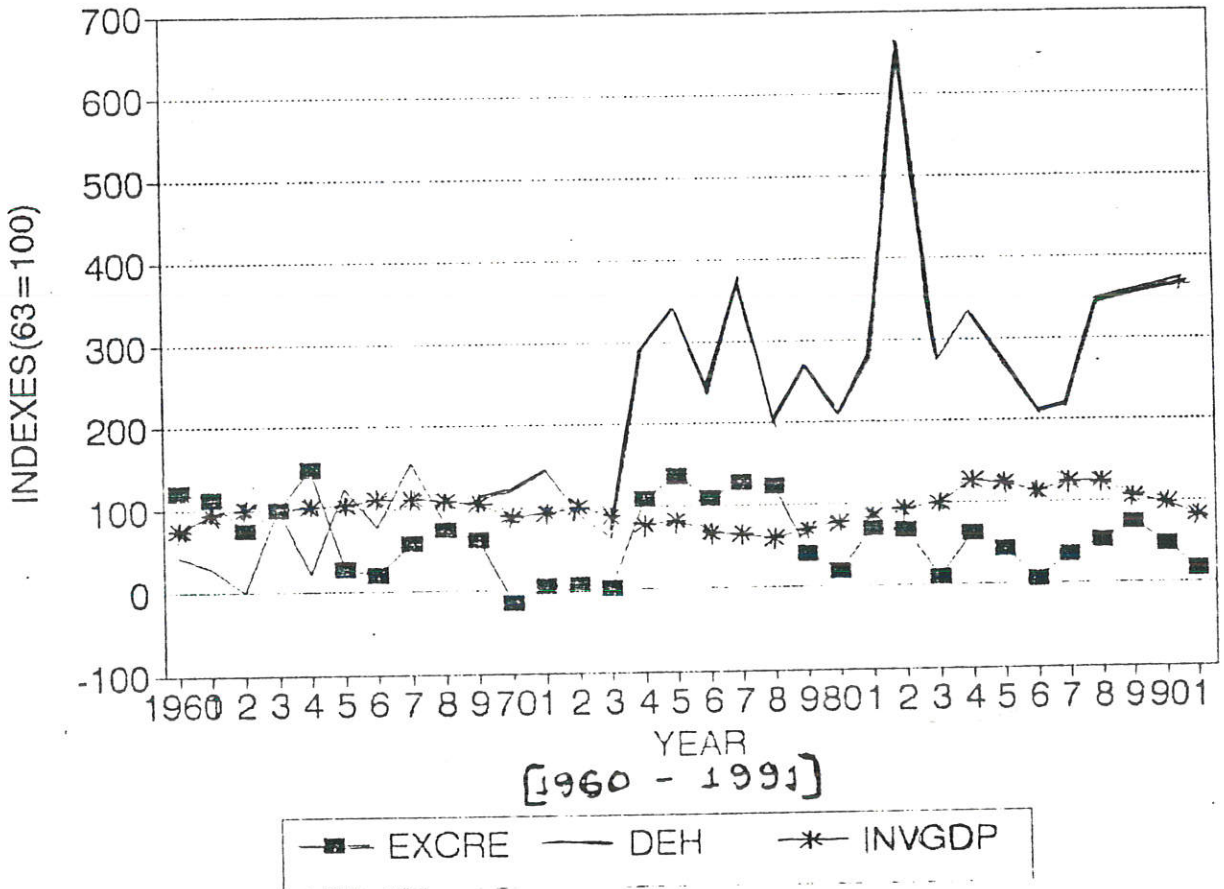


Fig. 4.5

ACTUAL & EQUILIBRIUM RER INDEXES.

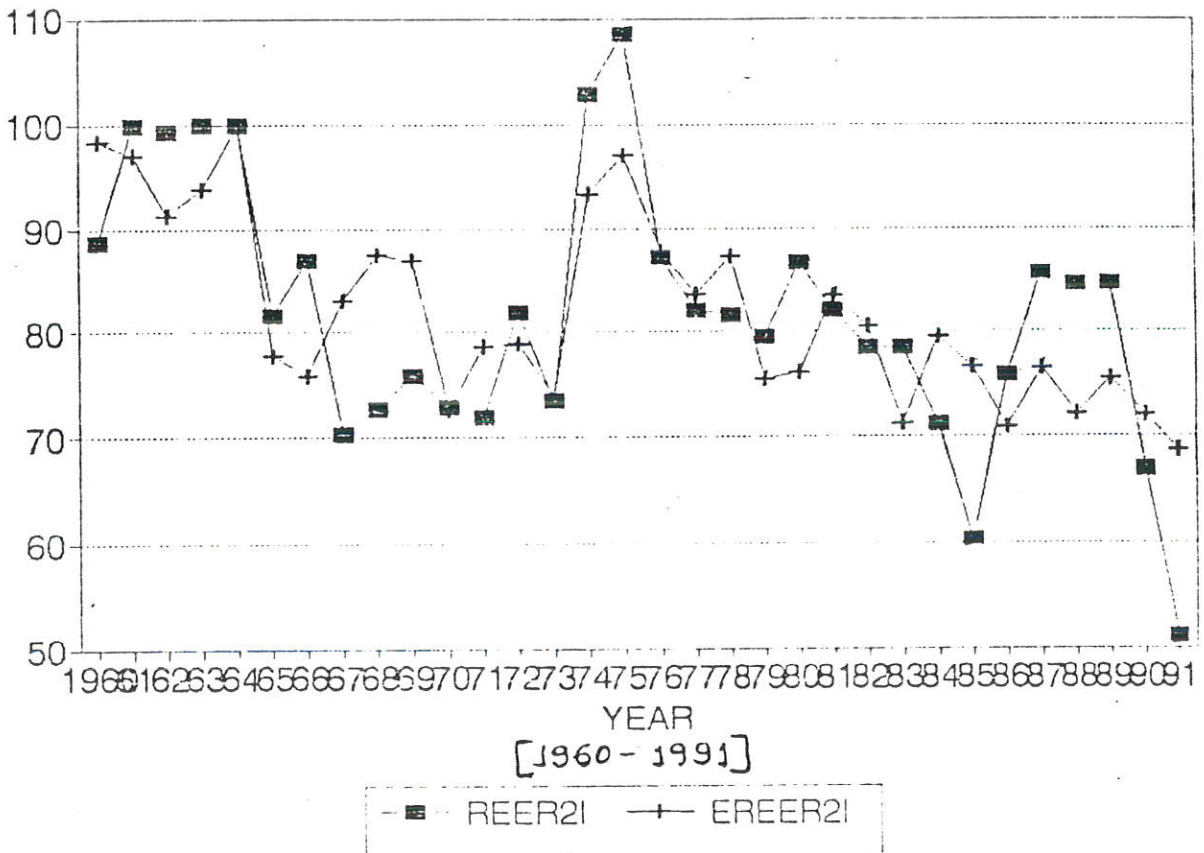


Fig 4.6

ACTUAL & EQUILIBRIUM RER INDEXES.

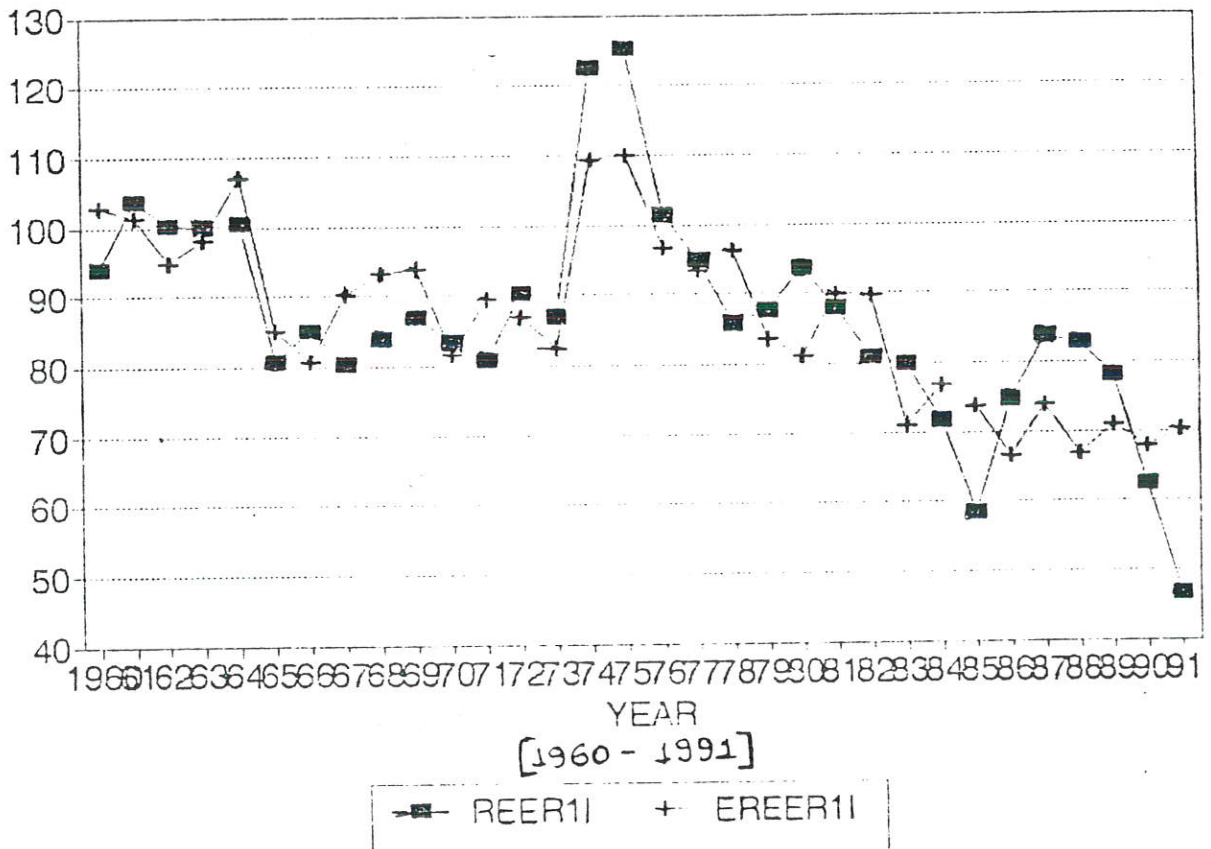


Fig. 4.7

ACTUAL & EQUILIBRIUM RER INDEXES.

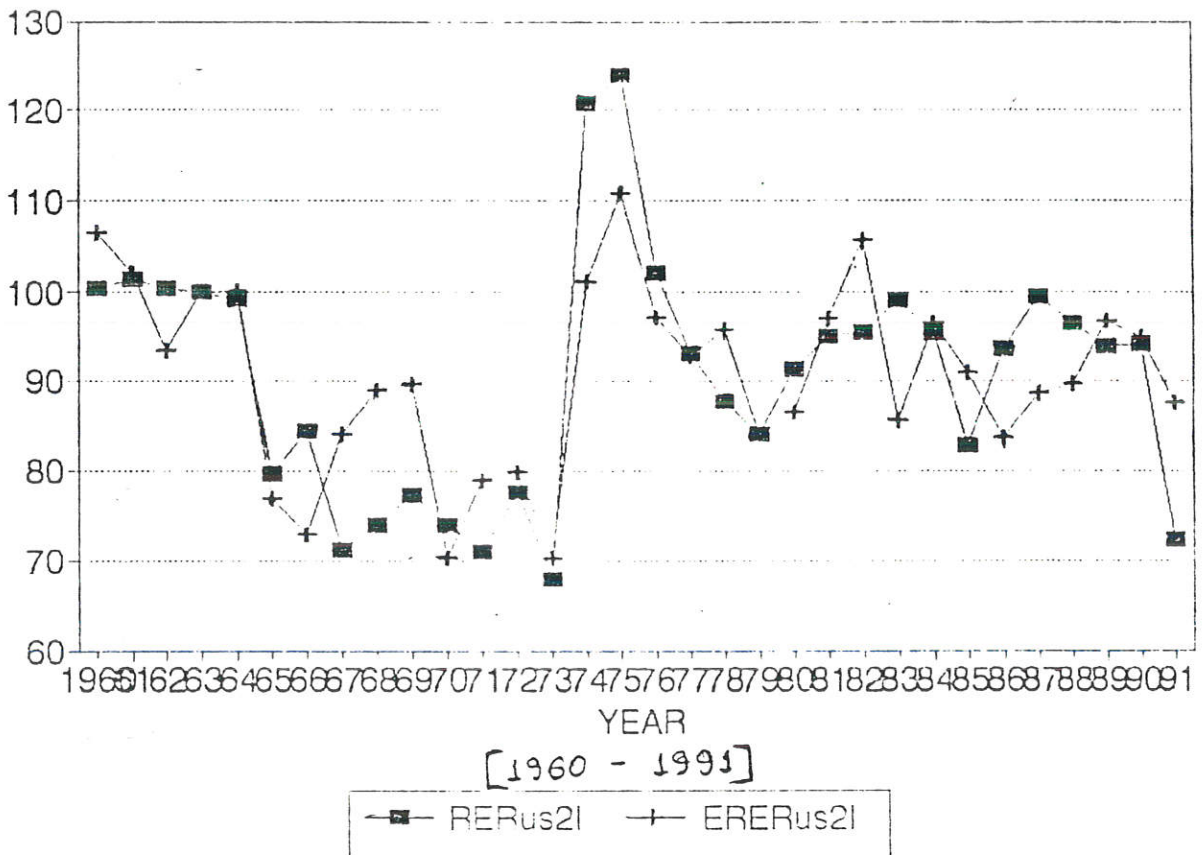


Fig. 4.8

ACTUAL & EQUILIBRIUM RER INDEXES.

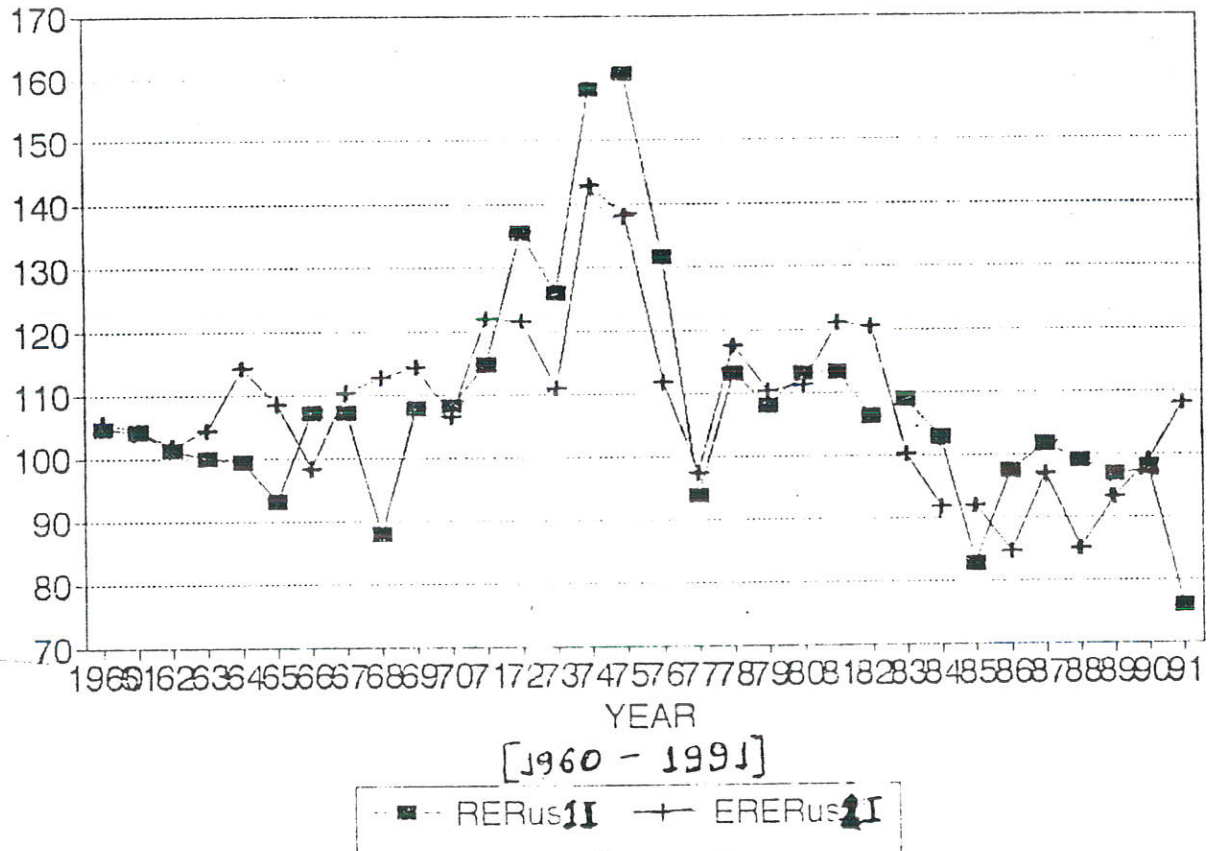


Fig. 4.9

EFFECTIVE RER INDEXES

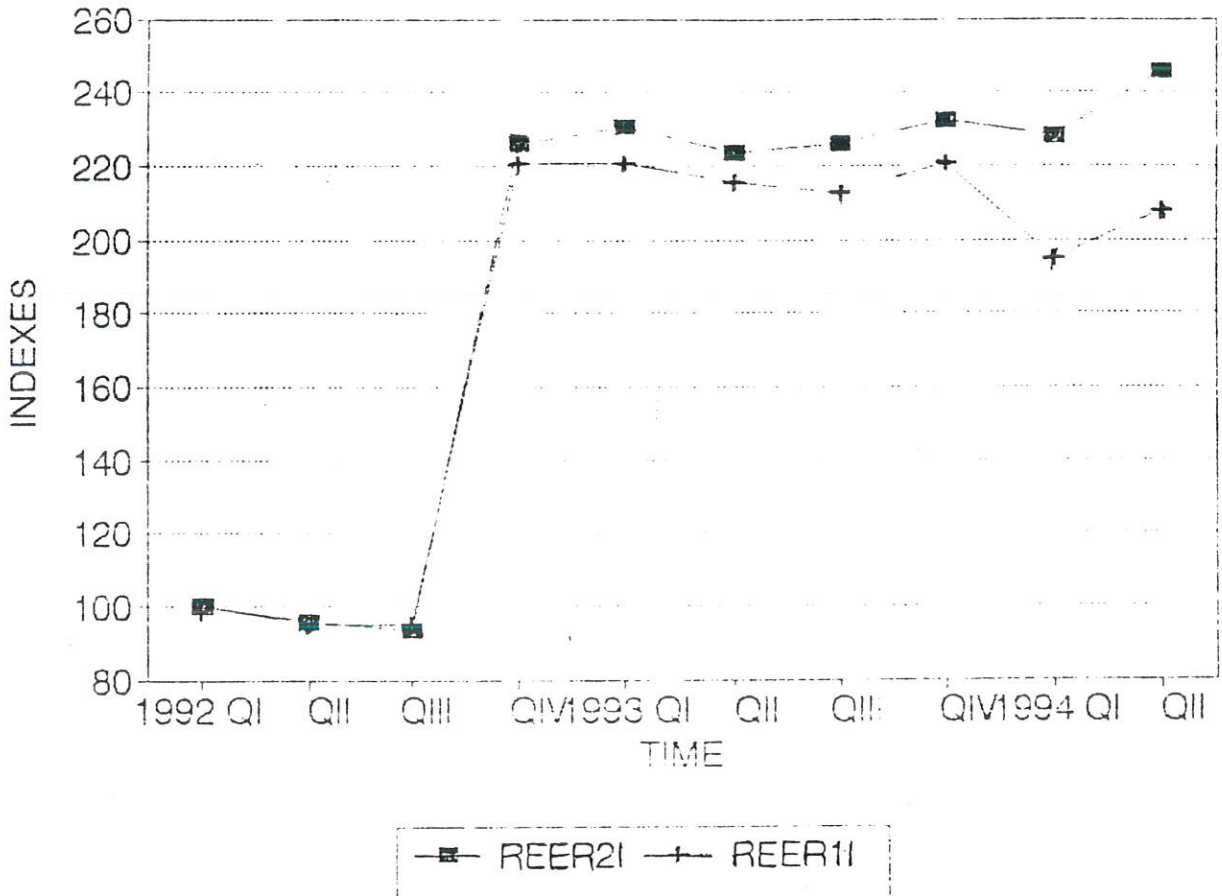
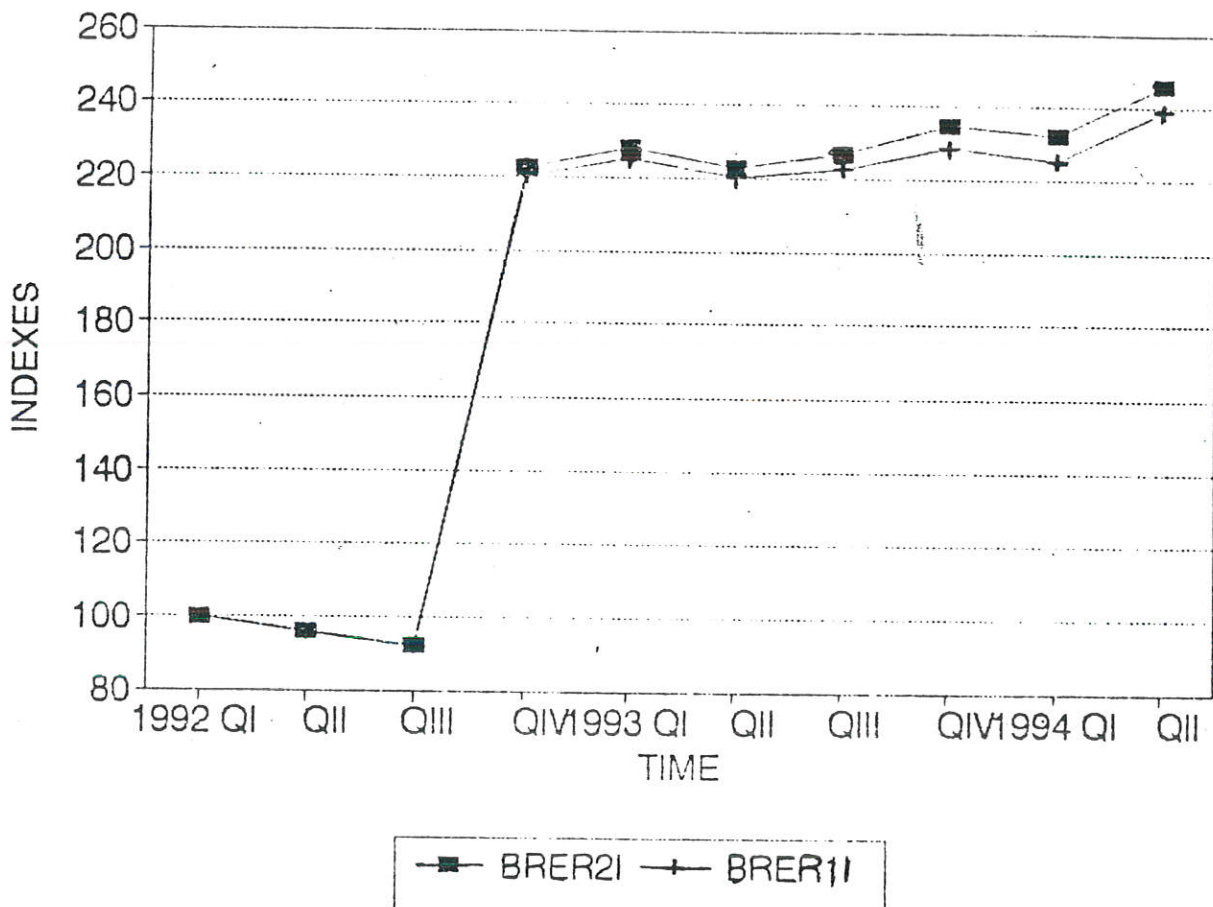


Fig. 4.10

BILATERAL RER INDEXES



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DECLARATION

" This thesis is my original work and has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged."

Candidate: Andwalem Berhanu

Signature:  _____

Date: June 26 1996