ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULITY OF BUSINESS AND ECONOMICS

THE DETERMINANTS AND DYNAMICS OF AGGREGATE MERCHANDISE IMPORTS IN ETHIOPIA

By Dejene Leggesse

Thesis submitted to the School of Graduate Studies of Addis Ababa University in partial fulfillment of the requirements for the Degree of Master of Science in International Economics

June 2005

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

The Determinants and Dynamics of Aggregate Merchandise Imports in Ethiopia

By
Dejene Leggesse Abebe

Approved by the Board of Examiners:

Dejene Aredo	
Advisor	Signature
Dr. Shail Singh	
Examiner	Signature
Dr. C. Panda	
Examiner	Signature

TABLE OF CONTENTS

Content	Page
1. Introduction----------	1
1.1 Background ----------	1
1.2 Statement of the Problem ----------	3
1.3 Objectives of The Study----------	6
1.4 Hypothesis----------	6
1.5 Significance ----------	7
1.6 Scope of the study ----------	8
2. Review of Literature----------	9
2.1 The Theoretical Literature----------	9
2.1.1 General----------	9
2.1.2 Trade Policies and Imports---------	13
2.1.3 Import Substitution and Export Promotion strategies ----------	17
2.2 The Empirical Literature----------	23
3. The Ethiopian External Sector ----------	30
3.1 The Macro economy in Brief----------	31
3.2 The Trade Balance----------	32
3.2.1 Structure of Merchandise Exports---	34
3.2.2 Structure of Merchandise Imports --	40
3.3 Direction of Trade ----------	46
3.4 Trade Policies in Ethiopia ----------	48
3.4.1 The exchange Rate----------	49
3.4.2 Tariff and Non- Tariff Trade Barrier	50
4. Specification of the Model, Estimation Techniques and the Data ----------	55
4.1 Specification of the model ----------	55
4.2 Estimation Technique ---------- ------	60
4.3 Variable Definition and Data Sources---	64
4.4 Characteristics of the data ----------	66
4.5 Estimation methods ----------	66

5. Estimation Results ---------- 67
5.1 Diagnostic tests ---------- 67
5.2. Cointegration Test and Estimated Cointegrated Relations ---------- 70
5.3. The Short run Behavior of Imports ------- 75
5.4.Individual Import Categories ---------- 79
6.Summarry and Conclusion ---------- 86
6.1. Summary of the Results ---------- 85
6.2. Conclusion ---------- 88
7.References ---------- 91
8.Annexes ---------- 94

LIST OF TABLES

Table		Page
1.	Evolution of Major Macro Economic Variables.	31
2.	Trends in Trade Deficit ----------	33
3.	Percentage share of imported inputs --------	40
4.	Trends in the relative share of comp. of imports	41
5.	Percentage Growth Rate of Volume of Merch. Imports	44
6.	Direction of External trade, Exports as percent of imports ----------	48
7.	Estimation Results of the error correction model	77
8.	Estimation Results of the Error Correction Model For Consumer goods ----------	82
9.	Estimation Results of the Error Correction Model for Capital goods ----------	83
10.	Estimation Results of The Error Correction Model for Raw material and Semi-finished Products--------	84

LIST OF FIGURES

Figure	Page
1.Trends in the volume of Exports and Imports ------ --	32
2.Trends in Percentage Growth in Total Export Earnings--	36
3.Trends in percentage Growth in Coffee Export Earnings-	36
4.Trends in Percentage Growth of Total Volume of Exports-	37
5.Trends in Percentage Growth of Volume of Coffee Exports	38
6.Trends in Unit Value of Coffee Exports ----------	39
7.Trends in Percentage Growth of Total Import Bill ----	42
8.Trends in Percentage Growth of Non-fuel Import Bill-	43
9.Trends in Percentage Growth of fuel Import Bill ------	43
10.Trends in the Percentage Growth of total Volume of Imports ----------	46

ABSTRACT

Ethiopia imports goods and services under serious foreign exchange constraint. Export earnings finance less than fifty percent of imports. For this reason there was excess demand for foreign exchange in the past four decades. The purpose of this study is therefore, to characterize the behavior of demand and determinants of imports in Ethiopia. The study used error correction and cointegration as well as descriptive analysis.

In the short run, one of the most important determinants of aggregate merchandise imports in Ethiopia is found to be foreign exchange availability in the form of international foreign exchange reserves. Economic activity (real GDP), the relative prices (in this study the real exchange rate) have no significant influence in the short run. However, all together with international reserves have significant influence in the long run. The other important determinant of imports both in the short and long run is trade policy regime. Openness of the economy had given rise to magnified and accelerated growth in imports.

One important implication drawn from the analysis is that the need for export promotion and diversification measures in order to fill the fast growing trade deficit.

1. INTRODUCTION

1.1 Background

In the contemporary world, a country can hardly meet all its economic development requirements in isolation. In most economies all goods and services required for development and consumption are not domestically available in the required quantities and qualities. That is why international trade is among the mechanisms believed to be the 'engines' of economic expansion (Kannen 1996, Salvatore 1998).According to Dolar (1992), imported intermediate goods play prominent role in the aggregate production function(s) of developing countries' economic activities. In some countries, the share of energy and non-energy intermediate imports can even exceed 70 percent of total GDP (World Bank, 2001).

Several studies emphasize the importance of technology and merchandise imports to the development process of developing countries. For instance, in China, Hongxin Zhao (1995) concluded that increased imports of technology have enhanced the development of indigenous technology both in the dimension of technology generation (research and development) and its utilization.

However, the behavior of the demand for imports in developing countries is different from that of developed economies. The economies of LDCs are vulnerable to the prevalence of domestic rigidities (in responding to changes in policy and adjustment measures) and external shocks (Agenor and Monteil 1996, Poreter and Ranney 1982; et al). These rigidities in

turn result in inconsistent results and/or failure of policies in achieving the desired objectives. Another part of the rigidities is observed in foreign exchange and borrowing constraints (which significantly affect their capacity to import), and flexibility of prices and wages (ibid). The nature of the rigidities of these factors determines the behavior of economic agents and the demand for imports in these countries overtime.

Being highly dependent on imports, these countries especially those in Sub-Sahara Africa are subject to import compression policies in response to the balance of payments crises they are facing. Moreover, according to Porter and Ranney (1982), imports of many developing countries have little or no domestic substitutes, and have unitary income elasticity of demand.

In the developed countries, relative prices and level of economic activity are the key variables that determine the level of imports. In developing economies, however, volume of imports are determined indirectly via changes in foreign exchange earnings or the capacity to import(Hemphill 1974 and Moran 1988). In developing economies, changes in the level of international reserves and the level of foreign exchange earnings are important elements in addressing the demand of economic agents for foreign goods (Moran 1988; Rotsso 1994; et al).

In times of serious shortages of foreign exchange, the governments use foreign exchange rationing among selected (or strategic) sectors and/or importers. This is done in order to allocate the available foreign exchange subject to certain predetermined priorities and constraints. During the 1980s,

for instance, most of the governments in sub-Sahara Africa had chosen this strategy to handle the foreign exchange constraints they were faced with. They used to have direct control of foreign exchange earnings and its allocation for imports. Obviously, this constraint limits capacity utilization and expansion (Rottso, 1994). This had been also true for Ethiopia during the Derge regime (1974-1991).

The next sub section discusses the research problem followed by brief presentation of the research objectives, hypothesis, significance to the study and limitations respectively.

1.2. Statement of the Problem

Due to the similar reasons as that of developing countries, the Ethiopian Economy relies heavily on imports (Jonse, 2002; Daniel 2001, Teressa 1997, et al). The country imports almost all capital goods; about sixty percent of the raw materials; petroleum and petroleum products. Others are consumer goods, which account for about 30 percent of the total merchandise imports. Imports of food grain account for 8 to 10 percent of total volume of imports. This indicates that the Ethiopian economy is one of the import dependent economies in Sub-Sahara Africa.

On the other hand, the economy is under serious shortage of foreign exchange earnings due to inadequate revenue from exports (MEDaC, 1999). The capacity to import was further eroded by foreign debt repayment (servicing). Similar to other developing countries, these are consequences of internal and external shocks.

for instance, most of the governments in sub-Sahara Africa had chosen this strategy to handle the foreign exchange constraints they were faced with. They used to have direct control of foreign exchange earnings and its allocation for imports. Obviously, this constraint limits capacity utilization and expansion (Rottso, 1994). This had been also true for Ethiopia during the Derge regime (1974-1991).

The next sub section discusses the research problem followed by brief presentation of the research objectives, hypothesis, significance to the study and limitations respectively.

1.2. Statement of the Problem

Due to the similar reasons as that of developing countries, the Ethiopian Economy relies heavily on imports (Jonse, 2002; Daniel 2001, Teressa 1997, et al). The country imports almost all capital goods; about sixty percent of the raw materials; petroleum and petroleum products. Others are consumer goods, which account for about 30 percent of the total merchandise imports. Imports of food grain account for 8 to 10 percent of total volume of imports. This indicates that the Ethiopian economy is one of the import dependent economies in Sub-Sahara Africa.

On the other hand, the economy is under serious shortage of foreign exchange earnings due to inadequate revenue from exports (MEDaC, 1999). The capacity to import was further eroded by foreign debt repayment (servicing). Similar to other developing countries, these are consequences of internal and external shocks.

Evidences show that export earnings were covering about 66 percent of the total import bill in the 1960s, which declined to less than 40 percent in the 1990s. Similarly, trade deficit has grown from 3 percent of the GDP in the 1960s to about 15 percent in the 1990s (MEDaC, 1999). These are indicators of continuously eroded capacity to import, which in its effect led the country to run down its reserves and look for alternative sources of finance (loan and grant) to meet its import requirements.

The government had also been practicing import compression policies (during the 1970s, 1980s and early 1990s) that include direct import control measures and foreign exchange rationing to certain priority sectors and eligible importers (MEDaC, 1999; Feleke, 1995). The procedures for releasing foreign exchange for eligible importers were lengthy and there were about 425 goods officially declared in the negative list in 1970s, 1980s and early 1990s. During this period the exchange rate was fixed and import license and custom clearance procedures were lengthy. The fixed exchange rate resulted in overvalued real exchange rate, which lead Ethiopian exports to be less competitive in international markets(ibid).

This shows that foreign exchange allocation and import control policies were among the non-tariff barriers that restricted import of goods during the period mentioned[1].

Emperically, there are few evidences that characterize the structure and the factors that determine the behavior of imports over time in Ethiopia. Terressa (1997), in his study

[1] According to Milner (1990), this creates anti export bias by altering the domestic relative price.

on impacts of foreign aid on imports estimated elasticity of aggregate imports with respect to price indices, general price level, real GDP net of exports, real foreign aid, real level of foreign exchange earnings from exports, terms of trade, population and real exchange rate using data from 1968 to 1992. His findings are all significant with negative sign for coefficients of export earnings and population positive for the others.

However, his finding is questionable for the sign of the coefficient of export earnings in the model. In addition, his estimation did not only fail to consider the time series characteristics of the variables (stationarity, cointegration, etc.) but also include the level of international foreign exchange reserves as one of the explanatory variables, which according to the literature is key for stabilizing imports under foreign exchange constraint (Moran, 1988; Hemphill, 1974; et al). The author estimated the growth of imports and their contribution to openness of the economy without further consideration of the dynamics using advanced econometric techniques.

Further assessment of the literature on imports shows that there are few other deep studies made on the behavior of Ethiopian aggregate imports using recently developed econometric techniques and models applicable to import compressed economies.

Given the role played by imports in the Ethiopian economy in general and the external sector in particular, the need to study the behavior and determinants of imports is crucial. However, as mentioned above, unlike other external sector variables (exports and exchange rate, for instance),

there are few documented evidences that characterize the behavior of imports and their determinants. This study therefore attempts to examine and model the structure and determinants of aggregate merchandise official imports in Ethiopia.

To do so, the study uses descriptive analysis and estimates a model. The model is that specified by Hemphill (1974) and extended by Moran (1988) and others. It is estimated using single equation Engle & Granger (1987) error correction and Johansen and Juselius (1990) cointegration analysis. The analyses will cover four decades (the period 1960 to 2004).

1.2 Objectives of the Study

In general the purpose of the study is to explain the behavior of imports in Ethiopia in the past four decades. Specifically, the study attempts to

1. Characterize the dynamics of the structure; behavior and determinants of official aggregate merchandise imports in Ethiopia and
2. draw policy implications that can be used to shape the trade policy in Ethiopia.

1.4 Hypothesis

Following Moran (1988), Hemphill (1974) and others this study will consider international foreign exchange reserves, foreign exchange earnings, lagged imports, economic activity and the real exchange rate (as a proxy for the relative prices) as the main variables determining the volume of imports over time. Moreover, import restriction measures (trade policy regimes) and external

sector reforms pursued will be considered. Accordingly, the analysis will test the following hypotheses:

1. The real levels of Ethiopian aggregate merchandise imports are influenced positively and significantly (statistically) by level of international foreign exchange reserves, foreign exchange earnings, lagged level of imports, and economic activity and negatively by the real exchange rate (proxy for the relative prices),
2. The real levels of categories of imports (consumer goods, capital goods, and intermediate inputs) are influenced positively and significantly (statistically) by foreign exchange receipts; level of international foreign exchange reserves, and negatively by the real exchange rate (proxy for the relative prices) and
3. Liberalization of the Ethiopian external sector, especially trade policy reforms have significant impact on aggregate import performances.

1.5 Significance of the Study

As it has been mentioned earlier, in the import dependent Ethiopian economy, the behavior of imports has strong implications for trade balance or balance of payments and management of other macro economic imbalances. However, there are limited evidences that characterize imports and their short as well as long run behavior.

The available literature concentrates on analysis of the volume and composition of imports. For instance, the assessment by MEDaC (1999) concentrates only on trends of the volume and composition of imports. Given the existing

gap on the empirical literature, detailed study of the structure and behavior of imports as well as modeling their dynamics is worth pursuing.

This study, therefore, specifies an import model employing recently developed econometric techniques that are used to infer about short and long run behavior and dynamics of merchandise imports. In so doing, the study attempts to explicitly identify the major determinants (factors that caused for periodic fluctuations in imports), the nature and responsiveness of major components of aggregate official merchandise imports to these factors. The findings of the study will assist policy analysts and researchers in the area.

1.6 Scope of the Study

The study tries to analyze all respects of official aggregate merchandise imports in Ethiopia within the framework of Ethiopian external sector from which important conclusion and policy implications are drawn. However, there are some limitations to this. The first is that related with estimation using the data. Time series data from 1960 to 2004 is used. Data for the relative prices are not available for whole sample period- hence; it is proxied by the real exchange rate. It is also expected that hetroscedasticity and simultaneity problems may arise for which remedy is not designed in the study. The second is that related with software applied to the analysis. The software employed is Eviews 3.1, which has some weakness in applying Johansen approach for cointegration analysis and the other.

2. REVIEW OF LITERATURE

2.1 The Theoretical Literature

2.1.1 General

In the classical (Ricardian and Heckscher- Ohlin - Samuelson) theories of international trade the basis for imports of goods and services of any country are differences in comparative cost (or pre-trade relative prices). That means country imports goods and services of its comparative disadvantage (Bowen, 1998; Salvatore, 1998; et al) and exports commodities of its comparative advantage. The Ricardian theory explains comparative advantage in terms of cost (or supply) differences that arise from differences in technology across countries (ibid). The Heckscher-Ohlin-Samuelson model assumes technologies to be the same across countries and therefore instead consider comparative advantage to cost (supply) differences to arise from differences in factor prices between trading countries[2] (Salvatore, 1998; Bowen, 1998, et al).

However, these theories are based on the assumptions of perfectly competitive markets and homogeneous goods and focus on supply side determinants of bases for imports; and relative prices; namely factor prices and technology (Bowen, 1998; Salvatore, 1998; Bo Sodersten and Geoffrey, 1994 et al).

Relaxing the assumptions of perfectly competitive markets and homogeneous goods leads to examine reasons for import

[2] Factor price differences are in turn related to differences in relative supplies of factors productive factors across countries.

of these goods other than relative price (comparative advantage) differences between trading goods of countries (Salvatore, 1998; Bowen; 1998; Greenaway, 1996; Corden 1992, et al). Such reasons include differentiation in goods in quality and so on. If consumers in a country have a preference for variety import of varieties from other countries will take place. This means that in the absence of technological differences, taste differences can be reasons for imports of goods and services (ibid).

In modern trade theories imperfectly competitive market structures (monopoly and oligopolies) are another sources of imports of goods and services of countries (Salvatore, 1998; Bowen, 1998; Greenaway, 1996; Corden, 1992, et al). That is, even if there is domestic production of goods, imports could take place due to the presence of international monopolies that charge lower prices than domestic producers. This implies even though demand and all remaining supply side elements are identical across countries, relative prices could still differ between countries due to differences in economies of scale and/or market power.

Therefore, according to these theories, we can generalize that a country may decide to import a certain good or service from abroad: first, if it does not exist in the country at all in the required quantity and quality; secondly, if it is cheaper abroad at the current internationally competitive price (Piana, 1998; Kenen, 1996, et al).

Imports are key variables in the traditional open economy macroeconomic models, or in general in the external sector

of all open economies. This is because; level and fluctuations of imports can have significant impacts on macro as well as micro economic variables. In an import dependent economy for intermediate and capital goods, negative shocks and fluctuations on imports can displace domestic production (Piana, 1998; Chris Milner, 1990). This involves a fall in that sector's production, and employment. If imports completely have no substitutes from domestic supply, the impact could be serious for the entire industries in the economy (Piana, 1998, Bharat-Ram 1982, 1990; Egwaikhide, 1999; et. al.). However, the magnitudes of impact depend on the level of dependency and substitutability with domestic resources.

Meanwhile, in an open free market economy, the level of demand for imports depends on the relative prices of imports and exports (terms of trade) and the level of economic activity. More specifically, according to Piana (1998), the level of imports depends on: level and dynamics of domestic income and GDP components (investment, consumption, public expenditure, exports) commonly called domestic absorption. Moreover, level and dynamics of imports is a function of price competitiveness of domestic production, which normally is influenced by exchange rate level and fluctuations as well as by inflation differentials between the country and foreign nations (ibid). Non-price competitiveness of domestic production: product quality, design and promotion of products, technological innovativeness, national attitude towards foreign goods (changes in tastes), shifts in patterns of domestic demand and supply, historical links with certain origins or countries, and structural trends towards

economic integration with other countries are among other factors that influence level of imports of any country (Piana, 1998; Bharat-Ram 1982).

In many developing economies, the level of imports may also depend on the amount of flow of external aid (ODA), foreign debt, and flows of foreign direct and portfolio investment (Elbadawi, 1999; Malawanda and Suliman, 1999; collier, 1999, et al).

Increases in GDP and its components, appreciation of the exchange rate, lower inflation abroad than the domestic, increased integration with the rest of the world, and a stronger national specialization are expected to have positive influence on level of imports of a country (Blanchard, 1996: Piana, 1998; Bulgress, 1974, Egwalikhide, 1999; et al). If imported goods are luxury goods, their demand grows more than proportionally when GDP rises (ibid). However, we may have different elasticities of imports to respective changes of these GDP components.

In addition, imports are expected to be positively influenced by the widening gaps in quality of goods and technology of domestic production in comparison with foreign ones in the perception of domestic buyers (Piana, 1998, Blanchard, 1996; et al). Further, according to these authors, if changes in tastes of consumers and decision-makers in the distribution channels for domestic good is replaced by a "foreign is better" general opinion and when a right shift in domestic demand and a left shift in supply takes place we may have increased level of imports of a country.

3.1.2 Trade Policies and Imports

Even though international trade theories argue free trade leads to efficient allocation of resources and maximizes a country's social and economic welfare, countries impose trade taxes and other forms of restrictive measures on imports and exports. That is, despite the classical and neoclassical trade theories assumption of no trade barriers for social optimum, the practical problems in the process of international trade gave rise to trade restrictions as a 'second best' option (Cordon, 1998. The restrictions can be neutral or discriminating between sources of supply and type of commodity to be improved (Bowen 1998; Greenaway, 1996; Cordon, 1992 and 1998; et al).

There are different justifications for imposing import restrictions. The popular arguments for imposition of import restrictions are those related with terms of trade and infant industries (Salvatore, 1998; Cordon, 1992 and 1998; et. al.). In all the cases, the main reasons could be limits to countries' opportunities and gains from international trade and/or revenue considerations (ibid). The means of restrictions can be tariffs, special taxes and duties (thus providing revenue for the government) and/or broad class of non-tariff barriers (Bowen, 1998; Greenaway, 1996; Cordon, 1992 and 1998; et al).

The terms of trade argument for imposition of import restrictions refers to imposition of these barriers for the purpose of improving the deteriorating terms of trade of a country (Salvatore, 1998; Greenaway, 1996; Cordon, 1992 and 1998; et. al.). The bases for terms of trade argument for imposing tariffs is that the elasticity of import supply

abroad and demand at home are reasonable. If domestic demand for protected importable goods is price elastic and the foreign supply is not responding by decreasing the prices further, the tariffs will be successful in restricting the imports so that improving the terms of trade (Salvatore, 1998; Cordon, 1992 and 1998; et al). This means, if tariff is imposed on the importable good and the domestic demand is elastic, then it is likely that the increased prices consequently lead to the fall in the demand for imports. This leads to the improvement in the country's terms of trade (ibid).

The second major justification for import restriction is the famous infant industry argument. This justification is similar to that of the arguments of market failure for government intervention (Salvatore, 1998; Cordon, 1992 and 1998; et al). The argument was first endorsed by John Staurt Mill (1848), which according to Haberler (1936) has been accepted in principle by many free trade economists (quoted in Corden, 1998). Some infant industries may not be able to compete with well-established foreign industries in the import competing sector. However, these domestic infant industries may be competitive if they are given a chance to grow. Therefore, the argument recommends protection of these industries from foreign low cost low priced products until they became competitive enough. Such protection is recommended when social return is greater than private returns as well as social costs.

Other arguments among others include imposition of restrictions for the purpose of equalization of costs (due to cheap labour, etc.), reacting on other company's dumping

policies, and protecting domestic industries to reap the advantages of economies of scale (Salvatore, 1998; Cordon, 1992; Bowen, 1998, Greenaway, 1996 et al).

The importing country imposes tariffs on imported goods for equalization of costs when the imported products are low cost compared to similar domestically produced products. This is also similar with cheap labour policy arguments in that cheap labour policies result in reduction of costs of the imported products compared to domestically produced import competing products.

Dumping policies of trans-national monopolies and oligopolies with tremendous market power could also entail tariff and other trade policies as anti dumping devices in order to protect domestic firms. In cases where domestic firms have advantage of external and internal economies of scale or other strategic benefits over foreign ones governments protect domestic firms imposing trade barriers. In such cases optimum tariff will make their prices comparable with the domestically produced similar products (ibid).

In the modern literature we also find political motives for protection. Tariff and other protective measures are decided in a political market with belief that it pays to impose restrictions in order to gain the rents from protection. According to Frey. S. and Weck-Hannemann (1996) the pro-tariff groups (parties) mainly from import competing industries may have strong political position because their demand for protection is visible and understandable. On the other hand, anti tariff groups mainly composed of consumers, find it difficult to organize

It is also important to note impacts of protective measures on the exchange rate and other macroeconomic variables. The impositions of tariffs and non-tariff restrictions, other things being equal, may affect the level of output in the import competing industries, the general price level and employment. The effect on the exchange rate can be seen as a by-product of its effect on the demand for the imported goods the net effect depending on the type of exchange rate regime we are referring to (Cordon, 1998, Agnor and Monteil, 1998, et al).

The undesirable effects of trade restrictions (tariff and non-tariff barriers) have given rise to the application of the concepts of optimum tariff or Effective Rate of Protection[3] (ERP). That is, optimum level of any barrier is recommended whenever protection is inevitable (Weiss, 1988; Bowen, 1996; et al).

2.1.3 Import substitution and export Promotion Strategy

Another important issue worth mentioning when discussing trade policy is import substitution. Given the justification for protection, the two dominant trade strategies in the development economics literature are outward oriented or export promotion or inward oriented or import substitution industrialization.

---

[3] For a simple case effective rate of protection (ERP) is given by $ERP = \frac{t_j - \sum_{i=1}^{n} a_{ij} t_i}{1 - \sum_{i=1}^{n} a_{ij}}$, Where t_j denote tariff rate on importable product j: t_j denote tariff on importable input i; and a_{ij} represent share of i in cost of product j in absence of tariffs.

According to Bhagwati (1990): if more incentives are provided to import substitution (IS) than to export promotion (EP) activities, the strategy is considered IS or inward oriented; otherwise, it is EP or outward oriented. Import substitution strategies were results of export pessimistic views prevailed in the 1950s after the Second World War while export promotion strategies follow the success of some few economies that pursued export-promoting policies (Bhagwati, 1990; FitzGerald 1997).

For Bhagwati (1990), the most widely accepted definition of deliberate policy of import substitution relates to incentives. This definition states "a country is following import substitution strategy if the effective exchange rate for country's exports is less that for its imports" (Bhagwati, 1990 pp. 18). Hence, the effective exchange rate measures the incentives to export and import.

For Bharat-Ram (1982), "import substitution is defined as the ratio of the foreign exchange value of items deleted from the initial import list to the total foreign exchange value of a wholly imported product" (Bharat-Ram 1982, pp. 2). This definition is based on micro (firm level) foundations of import substitution. Bharat-Ram, stressed the point that "import substitution takes place by stages"

In addition to as a result of the 'deliberate government policies' import substitution can also occur 'naturally' in the course of economic growth and development (Morton and Tulloch, 1977; Bharat-Ram, 1982; et al). This is what is called natural import substitution. It takes place when domestic incomes rise and the range of products, which can be produced competitively for the domestic market increase.

When this occurs, goods that were previously imported due to small domestic demand to support competitive local production are gradually replaced or supplemented by locally produced goods (ibid).

Nevertheless, there are arguments on the significance and role of import substitution. The case for a deliberate policy of import substitution rests on two types of arguments (Morton and Tullock, 1977). The first argument) Morton and Tulloch, 1977) is that 'natural' import substitution, which is the process of developing and diversifying the domestic production structure. It is likely to be inhibited by the initial inability of domestic producers to compete with established foreign suppliers. It is therefore, the authors recommend that some form of protection to be given to domestic producers to allow the country in question to establish new industries and overcome their disadvantage imposed by foreign suppliers in import competing industries. It may also include giving incentives to new export-oriented industries, which have to compete with established suppliers. In this context, the implication is that import substitution or protectionist policies form part of a broad development strategy.

The second argument for import substitution rests on the export pessimists' view. This is based on the views of Raul Prebisch (1952, 1984) and Ragnar Nurkse (1959). Given the limitations on export earnings, which hold back the growth of imports needed by development, they propose the need for attempting to replace 'non-essential' imports through import substitution (quoted in Bhagwati, 1990; Morton and Tullock, 1977).

switching from the foreign to the domestic intermediates" (Chris Milner, 1990 pp. 123). Moreover according to Morton and Tullock, (1977) the development of high cost protected industries and discouragement to export industries limit the possibilities for subsequent export-oriented development.

In the neo-classical literature the critique of import substitution theory, according to FitzGerald (1997), rests on four areas[4]. The critique particularly concentrates on the Latin American theory of Import Substitution. The first critique of ISI theory rests on the resulting price distortions due to import tariffs in defiance of the principles of comparative advantage, which is a bias against primary exports, and thus a lower rate of growth and welfare levels arise than otherwise be achieved. The second is that protection of consumer goods (but not capital goods) and industrial wage support leads to inappropriate choice of techniques, and thus less employment and more imports than would obtain at international prices. The third critique is about consequences of exchange rate overvaluation in that an overvalued exchange rate to keep industrial costs down which leads to discrimination against both primary and manufacturing exports and promotes non-trade sectors aggravating the balance of payments problem. Finally, the forth critique is about the problems of government failure. Because, governments encourage excess public expenditure, industrial capitalists engage in rent seeking behavior and

[4] Particularly import substitution as a theory was developed by economists (dominantly structuralist by Prebisch and others) in the UN Economic Commission for Latin America (ECLA) and had been under implementation since the 1950s.

industrial workers force up wages under ISI generating chronic macroeconomic disequilibria.

Part of these critiques originate from evidences in the past four decades, that countries who pursued IS strategies (for example those in Latin America) have performed less than those countries with export oriented trade strategies (those in the south East Asia). In the Newly Industrialized Countries (NICs) for instance EP strategy yielded higher growth (Bhagwati, 1990). The reasons hypothesized why IS strategy has been dominated by the EP strategy are pertinent to the above-mentioned neoclassical views.

The first reason hypothesized is that EP strategy brings incentives for domestic resource allocation closer to international opportunity costs and hence produced efficient outcomes (Bhagwati, 1990). The second focuses on another important aspects of the differences between EP and IS strategies: directly unproductive profit-seeking and rent-seeking activities. These divert resources from productive use into unproductive. The final reason advanced rests on the problems with IS regimes to favor of foreign direct investment. This is because, the IS regimes have tended to use domestic resources inefficiently in the ways mentioned under the first reason; the same applies to the use of foreign resources (Bhagwati, 1974 and 1990).

However, the increasing adoption of liberalization policies by many countries especially in the 1990s suggests the new export pessimistic views have no deep ground (World Bank 2001). In any way, IS strategy is no longer a dominant strategy for it swung the weight of academic opinion to the EP strategy by the late 1960. The 1980s debt crisis,

according to Bhagwati (1990), the slowing down of the world economy since the 1970s, the continuing depression of primary product prices and the development of powerful protectionist sentiments in the developed countries as well as new intellectual and academic arguments supporting inward looking trade policies in developing countries, although not strong, have refreshed export pessimism of the 1950s which is called the second export pessimism (ibid).

2.2 The Empirical Literature

The empirical literature in international trade in general imports of goods and services in particular focuses on its role in the development process of countries. The levels of imports depend on availability of foreign exchange and the factors that affect it (Motron and Tullock, 1977; Sekkat and Varoudakis, 1998; et.al).

Experience of many countries show that imports of goods and services are key for economic growth and development (ibid). Several cross-country empirical studies indicated strong relationship between trade and growth. Reports by the World Bank (2001) suggested that tariff and non-tariff barriers have strong negative coefficient in countries' growth equation. There is positive relationship between openness and economic growth (Bhagwati 1978; Little, David et al 1970, et. Al).

Imports, according to Bhagwati (1990) may "relieve short-term domestic bottle necks" by making the economy operate more efficiently near full employment. For instance, assessment by ECA (1999) suggested imports of capital goods

had enhanced technology adaptation and transfer in all East Asian countries. This is consistent with Hongxin Zhao's (1995) conclusion in China that increased imports of technology have enhanced the development of indigenous technology. Further, in their policy, East Asian countries' (in Taiwan for instance) governments used to screen the import of capital goods through FDI and give incentives for desired types of capital good imports (ECA 1999).

For similar reasons, most of the developing countries' economies especially those sub-Saharan Africa are import dependent (World Bank, 1985 and 2001). There is imperfect substitution between imports and home goods. According to Ndulu (1990), for sub-Saharan Africa, the amount of ratio of investment goods imports to real investment was about 35 percent during 1980-87. He also has found a positive relationship between capacity utilization and intermediate imports.

Several country case studies emphasize the role of import dependency Rottso (1993). To minimize this dependency, Rottso (1993) points out that for governments import controls were attractive alternatives in 1970s and early 1980s during which debt crisis persisted. When external financing was extremely difficult many countries practiced import control measures, which in turn influenced the supply side of their economies.

The level of export earnings and foreign exchange savings determine the capacity of a country to import. Poor export performances resulted in decreased capacity to import. This in turn has affected the export side via the availability of imported capital goods - essential at least to maintain

the existing production capacity (Chris Milner, 1990; Sekkat and Varoudakis 1998; et. Al).

On the other hand, many developing countries have little control over the prices of the goods they export and import (Agnor and Monteil 1996; Porter and Ranney 1982; et. al). This exogeneity of the terms of trade is reflected both by their small share in the world trade and by the composition of their exports and imports. Domestic prices of tradable goods depend on world prices, the level of subsidies, tariffs and the exchange rate (ibid). According to the authors, due to capacity constraints and delays inherent in increasing exports, the price elasticity of export supply is likely to be small. For many of these countries the authors continue, primary commodity exports with exogenously determined prices account for significant source of their export earnings as well as macroeconomic disturbances.

This has made many countries dependent on foreign aid and loan (Ilbadawi, 1999). The servicing of external debt is another central policy issue in this regard.

For many developing countries foreign exchange availability can be affected by drastic cut backs in foreign lending, increases in the interest rate, and declining commodity markets that require adjustments in their domestic economies (Hemphill 1974, Moran 1988). This suggests that in these countries imports are under foreign exchange constraint.

Moran (1988) used panel data for 21 countries to estimate elasticities of imports with respect to changes in these

variables. The author estimated foreign exchange availability elasticity of imports ranged between 0.5 and 0.8. Foreign exchange reserve elasticity 0.1, price elasticity ranged between -0.3 and -0.1, and income elasticity between 0.2 and 0.4. Accordingly, Moran concluded that "policies that concentrate exclusively on aggregate demand (fiscal and monetary policies) or on switching expenditures between tradables (exchange rate policies)" would have limited effect on volume of imports. The success of these policies designed to influence these variables in having a smooth flow of imports will rely on the possibility of exports of developing countries to developed countries' markets.

Yuan and Koachhar (1994) using Johansson's cointegration and error correction model found the behavior of China's imports to depend positively on the level of foreign exchange reserves, negatively on relative prices both in short and long run. Rogers (2003) in Fiji reported that imports are well explained by movements in the exchange rate and economic activity. Pick and Vollrath (1994) concluded real exchange rate misalignment influenced agricultural export performances in developing countries.

For sub-Sahara African countries, Sekkat and Varoudakis (1998) concluded the main factor that gave rise to de-industrialization was import compression, which led into cut in industrial production. The reason according to the authors was import substitution industrialization pursued after independence.

In trade and economic performance, there is tremendous variation within African countries. Although it is not

sustained, evidences show that many countries have experienced periods of a decade or more of high expansion (Roderick, 1997). Reports by the World Bank indicates during the 1980s extensive trade liberalization along with other reform measures have helped some reforming countries such as Uganda and Ghana which had long periods of economic decline. In others such as Mali and Gambia, trade reforms have boosted trade volumes with less performance in the growth front. According to this report the two successful countries in the region are Botswana and Mauritius who followed independent trade policy. On the other hand, in some countries of sub-Saharan Africa, for instance Ghana, import competition due to liberalization measures has hurt a large part of manufacturing sector (Sekkat and Varoudakis, 1998).

Regarding imports, Egwaikhide (1999) had examined the determinants of imports in Nigeria using error correction model. His results are consistent with that of Moran's conclusion. Short run change in the availability of foreign exchange, the relative prices and real output significantly explained the growth of total imports during the period under consideration. Mwega (1993) found insignificant results of the short-term elasticity of aggregate imports with respect to short run changes in relative prices, the real income and lagged value of imports for Kenya. Cheelo (2002) has made similar estimate for Zambia and has found significant results for short-term elasticities of imports with respect to changes in income, international reserves, lagged level of imports and foreign exchange availability.

Ghura and Grennes (1992), Sekkat and Varoudakis (1998), and others agree that the real exchange rate misalignment had adverse influence on exports and imports, and ultimately on economic activity especially on investment in sub-Sahara Africa. The level of imports in African and other aid dependent economies according to Ilbadawi (1999) also depend on flow of external finances in the form of aid, external borrowing and foreign direct investment (FDI). Increases in the flow of foreign finances may result in real exchange appreciation making imports cheaper and expanding aggregate demand leading to unsustainable increase in imports (ibid).

Terressa (1997) in his study on the impact of foreign aid on imports and economic performance specified an import model for Ethiopia. He took import price index, general price level, real GDP net of exports, foreign aid,real level of level of foreign exchange earnings, terms of trade, population and real exchange rate as explanatory variables using the data 1968 to 1992.

He found significant coefficients with negative sign for export earnings and population and positive for the others. However, the method employed and the results obtained are questionable for he has not considered the time series characteristics of the data.

Alemayehu (1999) concluded that the external sector in Ethiopia has structural problems especially on the supply side of exports. He called for actions to strengthen the supply side and appropriate regulations.

Studies on the real exchange rate: Andualem (1995), Befekadu (1991), and others have suggested that the real exchange rate in Ethiopia has been misaligned during the periods prier to its devaluation in 1992 which indirectly has affected the capacity of the country to import.

Alem (1995), using generalized import model (during the period 1969-1991)and based on Engle-Granger cointegration method found income elasticity of imports to be negative and weakly significant in the long run but not significant in the short run (in Sawasew 2004). Tura (2001) using the quarterly data during the period 1970/71-1999/2000 indicated that real income does not have a significant effect on imports in the long run while it positively and significantly affects imports in the short-run. Solomon (2000) estimated import demand based on Engle-Granger and Johansen estimation procedures for the period 1960-1995 in Ethiopia. He found elasticity of import demand with respect to real income to be positive and significant both in the short and long run.

Sewasew (2004) indicated that imports do not depend on real income in the long run, but on international reserve. In the short run, import depends positively on real GDP growth and foreign receipts, and negatively on relative price.

However neither of these studies helps to arrive at clear conclusion about the behavior of imports in Ethiopia.

3. REVIEW OF THE ETHIOPIAN EXTERNAL SECTOR

3.1 The Macro Economy in Brief

In the last four decades, the Ethiopian economy had been governed by three regimes with distinct domestic and foreign policies. The period before 1974, the imperial era, was largely characterized as a market based and privatized economy. During this period modernization of the economy was started (Jonse, 2002). Other features of the economy during this period include its more or less openness to the rest of the world and out ward orientation.

The Derge regime (the period 1974-1991) had changed the over all policy of the country towards socialist oriented command economy. Large and medium private enterprises were nationalized. The development strategy became inward orientated which is based on import substitution external trade strategy. During this period, the trade regime was marked by its over valued exchange rate, foreign exchange rationing, wide use of subsidies to some selected sectors and groups of people. Tariff and non-tariff trade barriers mainly intended to raise government revenue, discourage private imports and thereby restrict foreign exchange demand were other features of the foreign sector in this period. Viewed as a whole the economy suffered from stagnation and recession in contrast to the pre 1974 era. The economy during this period was marked by decline in the over all growth performances and worsening of imbalances in the internal and external sector (MEDaC, 1999). This period was characterized by war with Somalia and elongated civil

war to which the government gave priority to import weapons than other commodities.

In 1992 the socialistic development policy was replaced by the out ward oriented market economy accompanied by series of structural adjustment, macro economic stabilization, and institutional reform measures. The reform in the external sector includes liberalization, tariff rationalization, and devaluation of the currency (MEDaC, 1999).

The evolution of major macro economic aggregates is summarized in Table 3.1 below. During period covering 1972/73 to 1992/93, real GDP was in a recession, reaching its depression in 1987/88 to 1992/93. Inflation was also high reaching to its peak during 1987/88 to 1992/93

Table 3.1 Evolution of Major Macro economic aggregates

Period	1962/63 - 1966/67	1967/68 - 1971/72	1972/73 - 1976/77	1977/78- 1981/82	1982/83 - 1976/87	1987/88 - 1992/93	1992/193- 1999/00
Real GDP Growth rate (%)	4.7	4	1.3	2.3	3.7	-0.01	5.7
Investment as % of GDP	13.5	12.6	9.7	11	14.3	13.4	15.9
Saving as % of GDP	11.4	11	9	4.7	6.5	7.1	5.3
Inflation (%)		1.7	11.4	10.7	3.4	11.8	3.8

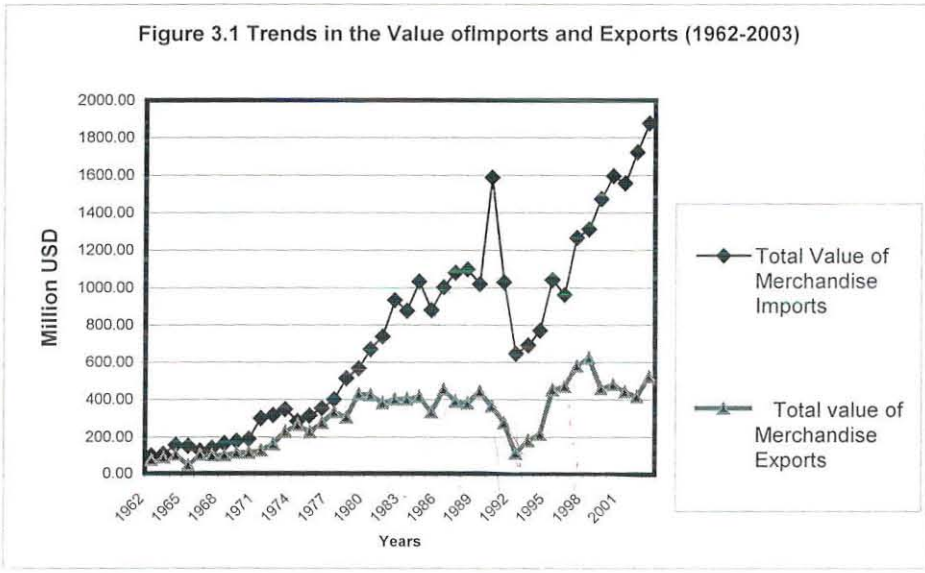
Source: Extracted from MOFED as computed by Alemayehu G., Abebe S, and J. Weeks, 2002, Page 19

Given this policy environment and overall economic performance a more detailed assessment of the external sector will be given in the forthcoming sub sections.

3.2. The Trade Balance

The stagnation and low performance of exports and the increasing demand for imports have resulted in persistent trade deficit. The general trend shows that imports were increasing far more than exports (with a highest rate in the 1990's probably due to the enhanced economic activities after the reform). The country's import bill is increasing steadily as compared to slow growing export revenue.

Figure 3.1 Trends in the Value ofImports and Exports (1962-2003)



Source: - Own Computation Based on Data From Customs Authority

In past four decades, while import bill is growing by about 13 percent export earnings (merchandise) grow by about 5 percent. Figure 3.1 confirms the widening gap between values of exports and imports. This shows the increasing dependence of the economy on the foreign sector (imported goods). One can conclude that the Ethiopian economy is a net importer. The trade deficit is filled by private and government transfers (remittances, bilateral, multi lateral and NGO assistances) and short and long-term loans.

Table 3.2 shows the trends in the trade deficit values of exports as percent of imports and the growth in trade balance. Trade deficit as percent of exports ranges from nearly fifty percent in the 1970's to more than double in the 1990's. In past four decades merchandise export earnings have covered on the average not more than 50 percent of the import bill. The highest deficit was in the 1990's (more than 65 percent) and the lowest deficit was in the 1960's (nearly 35 percent). The average growths rates in trade deficit were 48, 13, 14, and 33 percent in the 1960s, 1970s, 1980s, and 1990s, respectively.

Table 3.2 Trends in the trade deficit values of exports as percent of imports and the growth in trade balance

	1962-1971	1972-1981	1982-1991	1992-2003	Overall average
Trade Deficit as percent of exports	72.2	49.21	178.14	229.44	141.14
Value of exports as percent of total imports	63.45	69.38	37.71	33.21	51.07
Growth in Trade deficit	48.25	12.68	13.80	12.77	32.82
Openness Index (Total Imports and Exports as percent of GDP)	23.23	28.68	23.07	40.8	29.51

Source: - Own Computation Based on Data From Customs Authority

Alike the increasing trend in trade deficit, the economy's openness is widening. In the 1960s and 1970s, trade-GDP ratio (openness index) was 23 and 28.7 percent respectively. This figure declined to 23 percent in the 1980s due to the inward oriented trade strategy pursued and the civil war persisted. In the 1990s the index increased to about 40 percent due to the liberalization measures and expansion in the domestic economy.

3.2.1 Structure of Merchandise Exports

Ethiopian exports are primarily primary and semi finished agricultural commodities. These products cover more than ninety percent of the total export earnings. The first major component of the Ethiopian exports is coffee. It accounts for more than 53 percent of export earnings in the 1960s, about 55 in the 1970s, over 60 percent in the 1980s and 55 percent from 1990s onwards. The average contribution of coffee in the past four decades is estimated to be about 55.5 percent of the total merchandise export earnings. The second is hides and skins, which contribute about 12 percent of total export earnings. Export of oil seeds and pulses take the third and the fourth places, which account for about 6.5 and 5 percent of the aggregate merchandise export earnings, respectively. Annex 3.1 shows the percentage share of the values of some components of the aggregate official merchandise exports in the past four decades.

Ethiopian official merchandise exports have under gone no significant structural change in the past forty years. Coffee still takes the lead (53 percent) followed by hides and skins (12 percent), gold (7.6 percent) and chat (5.59 percent), which take second, third and fourth place in the 1990s. In the last decade (1992-2003) share of coffee export earnings have declined from 65.3 percent in 1998 to 39.5 percent in 2003 (annex 3.2). This decline in coffee and increase in the relative share of chat, gold and other export items could be due to the reform launched since 1992/93 in the foreign trade sector. Devaluation of the

currency, liberalization of the domestic markets and tariff reforms might have favored diversification of exports to other primary and manufacturing products. The second reason could be the decline in the price of coffee (terms of trade), which has decreased the share of coffee in the total merchandise export earnings.

When we see the trend in the growth of export earnings (Dollar values received at f.o.b.), in the past four decades, it is in a declining growth. It declined from about 10 percent in the 1960s to less than 5 percent in the 1990s (see figure 3.2). The rate of decline in the growth in total export earnings is estimated to be about 15 percent. There is similar trend for coffee. The Dollar value of coffee export earnings was declining from about 12 percent in the 1960 to about 5 percent in the 1990s. The rate of decline for growth of coffee export earnings is about 21 percent (see figure 3.3). The reason for this declining growth could be the deterioration in terms of trade for coffee and other export commodities.

Figure 3.2. Trends of Percentage Growth in Total Export Eanings (1962-2003)I

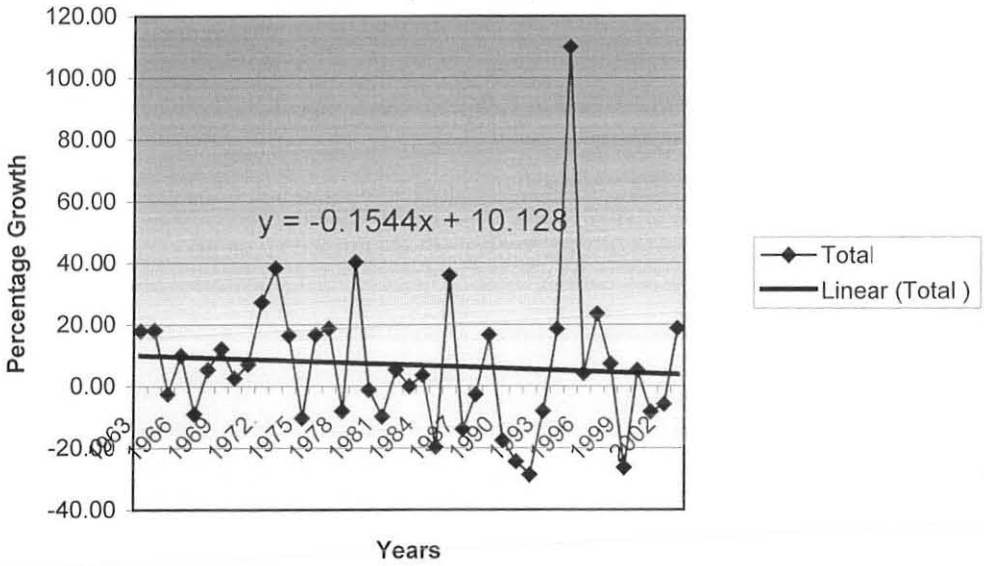
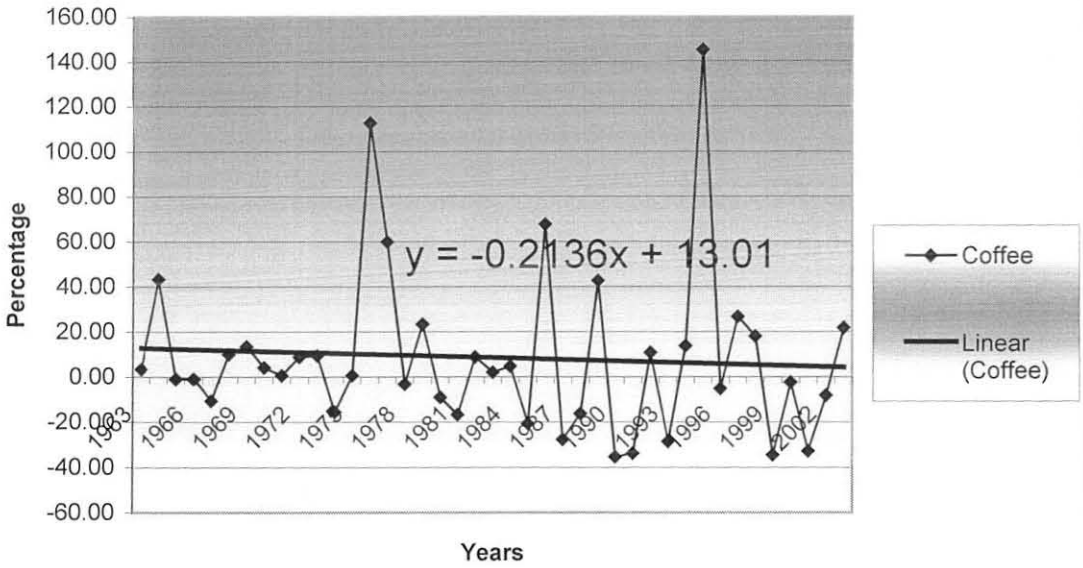


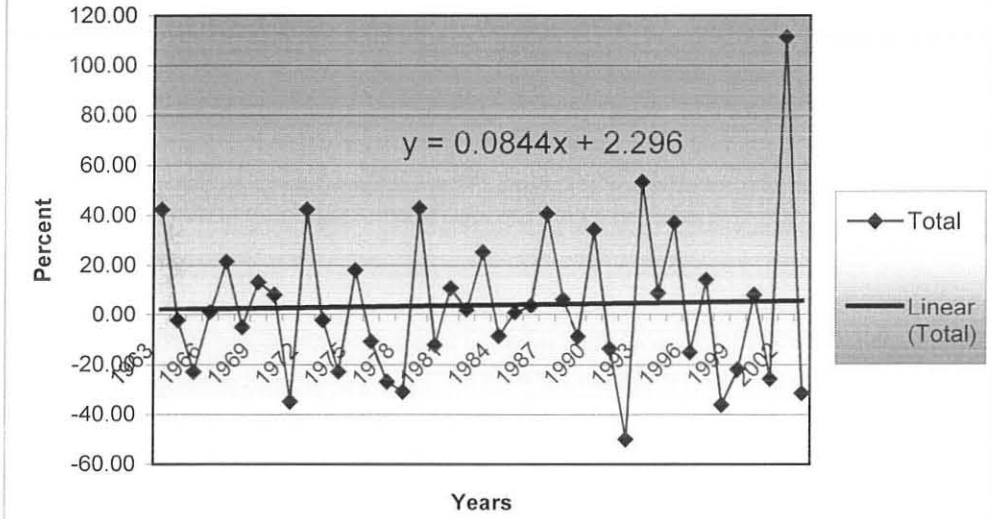
Figure 3.3 Trends in Percentage Growth in Coffee Export Earnings (1962-2003)



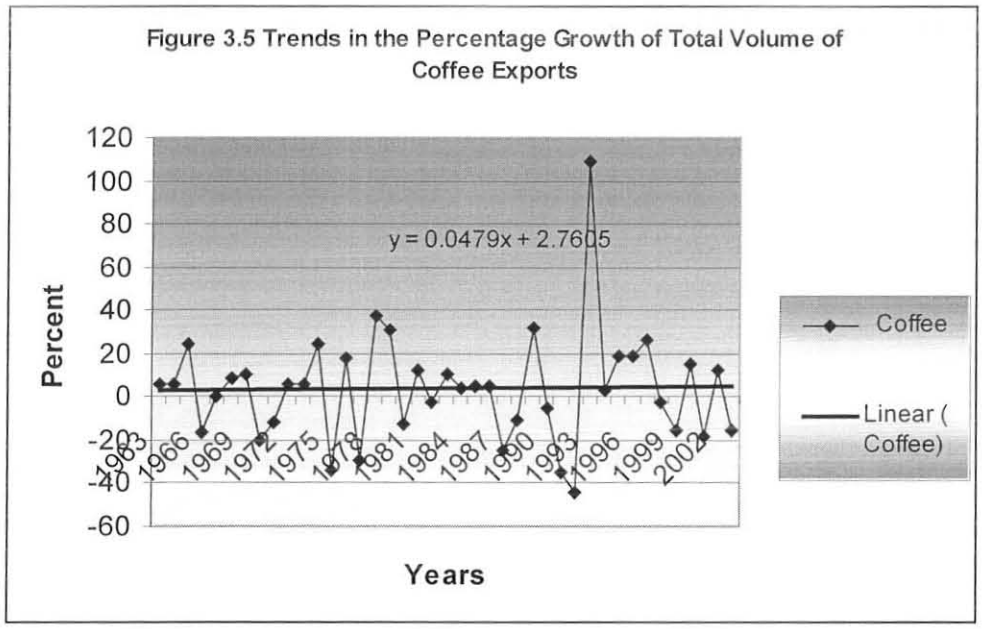
The real value (volume) growth of total official merchandise exports, in the past four decades, was fluctuating between negative and positive performances. However, its growth is in an increasing trend. Figure 3.4

and 3.5 give the trends in the growth in volume of total and coffee exports. The growth in total volume of exports had increased from about 2.3 percent per annum in the 1960s to about 5 percent per annum in the 1990s. There was similar trend for coffee, the major export commodity. It had been growing by about 2 percent in the 1960s and by about 5 percent in the late 1990s. The rate of increase in growth for total and coffee exports was about 8 and 5 percent, respectively.

Figure 3.4 Trends in percentage Growth of Total Volume of Exports (1963-2003)



Source: - Own Computation Based on Data From Customs Authority



Source: - Own Computation Based on Data From Customs Authority

The fluctuation and low performance of growth in the volume of exports could be due to the fall and rise in the price of coffee and other export items in world market (the deterioration in the terms of trade). This might have led producers to cut their coffee production and/or sell in the domestic market (coffee smuggling) where it is profitable. Demand side shift to other world suppliers or decline in demand for Ethiopian exports could be another reason.

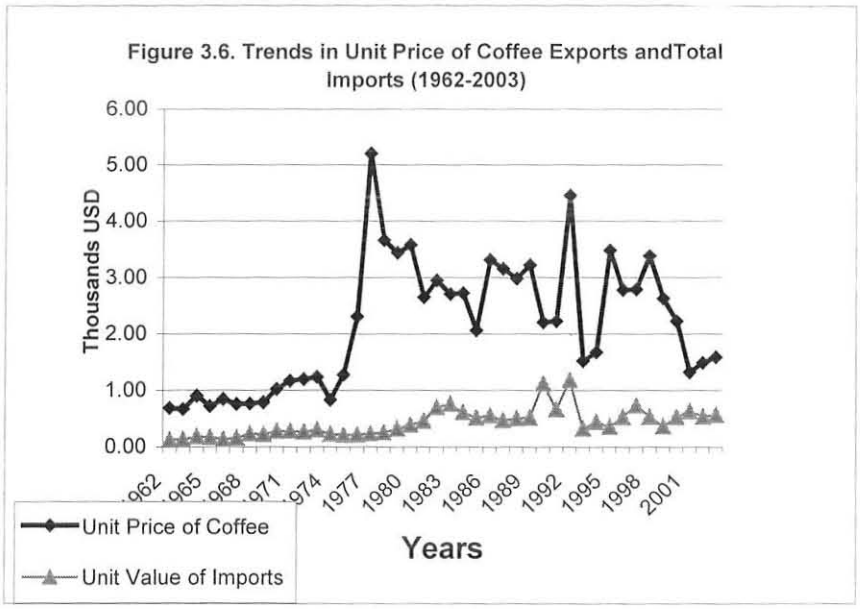
The following table (table 3.3) indicates the evolution of the trends in the terms of trade and purchasing power of exports. The trend in the index of both terms of trade and purchasing power of exports is decreasing from 1960s to 1990s taking 1980 as a base year.

Table 3.3: -indexes of term of trade (TOT) and Purchasing power of exports

	1960-1970	1971-1981	1982-1992	1993-2003	1980
TOT	118.9	132.5	73.4	54.5	100
Purchasing Power of Exports	99.9	128.8	86.2	77.2	100

Source: UNCTAD Hand Book of International Trade and Development Statistics (issues of various years)

The trend in the nominal price of exports of coffee confirms this fact. It had decreasing trend in the past two and half decades. This trend is plotted on figure 3.6 below. In the 1960s and early 1970 unit price of coffee was nearly constant. In 1977 it reached above 5 thousands USD per tone (the highest in the four decades) then it declined until 2001 to below 2.5 thousands USD per tone. This shows increasingly eroded purchasing power of a tone of coffee in the past two and half decades.



Source: Own computation Based on Data From NBE.

3.2.2 Structure of Merchandise Imports

In Ethiopia the majority of firms including those of Agriculture require some imported inputs. Imported inputs for the manufacturing industries account for more than 40 percent of the total input requirements (table 3.4).

Table 3.4: - Percentage share of imported inputs from total inputs used in the manufacturing industry groups

Industrial Group	1976	1979	1982	1997	1999
Food	22.2	24.9	13.7	17.87*	20.9*
Beverages	51.7	57	56.6	-	-
Tobacco	86.9	87.7	74.8	31.3	35.0
Textile	26.4	37.3	38	64.7	61.0
Leather and Shoe	31	18.5	24	26.4	7.2
Wood and Furniture	19.6	22.9	16.5	20.6	32.9
Paper and Printing	59.4	79.2	80.2	91.6	82.4
Chemicals	91.2	88.9	80.6	86.2	86.8
Non-metallic	33.2	34.2	46.4	0.0	0.02
Metal	87.7	89.9	95.2	89.0	90.5
Total	37.2	45.1	42.9	42.7	41.7

Note: * indicate the figure is for both food and Beverages

Source: Compiled from CSA Statistical Bulletins

According to annual report of the Ethiopian Economics Association (EEA) the manufacturing sector in particular to large extent depends on imports. The average import intensity (imported intermediate inputs as a proportion of raw material inputs) was about 50 percent during the period 1996 to 2002(EEA 2004). Similarly the import content of a unit cost in the manufacturing sector of Ethiopia is as high as 36 percent during the same period.

Ethiopia's merchandise imports include raw materials (tobacco, textile cotton fiber, metal ferrous, non-metal ferrous, metal ore, crude metal, crude rubber etc.) semi finished products (iron and steel, non-ferrous metal, oils and fats, chemicals, manufactured fertilizer, wood pulp paper, textile materials, building materials, and others) fuel (fuel wood, and charcoal, coal, and coke, crude petroleum, petroleum products, natural gas) capital goods (machineries and equipments used for transport, industries and agricultural sectors) and consumer goods (durables and non durables). In their purpose the country's imports can be categorized as industry and agricultural inputs, capital goods, and consumer goods.

In the past four decades on average capital goods account for the highest share (37 percent of the total) followed by consumer goods (which accounts for 29 percent), semi finished products (15 percent), fuel (13 percent) in the second, third and fourth place, respectively. Table 2.5 shows the trend in the relative share of each component of official merchandise imports.

Table 3.5 Trends in the relative share of each components of official merchandise imports in the Import Bill.

Years	Raw materials	Semi finished products	Fuel	Capital goods	Consumer goods	Others	Total
1962-1971	4.37	14.79	6.36	41.54	31.76	1.17	100.00
1972-1981	3.83	16.68	15.22	34.15	28.8	1.3	100.00
1982-1991	2.89	12.65	13.38	40.95	27.59	2.54	100.00
1992-2003	1.88	16.08	16.91	32.74	28.04	4.35	100.00
Overall Average	3.18	15.10	13.16	37.13	29.00	2.44	100.00

Source: - Own Computation Based on Data From Customs Authority

The trend in Ethiopia's imports show fluctuations below and above the average in the past four decades. Fuel had increasing trend reaching its highest peak in the 1990s (from 6.36 percent in 1960s to 16.9 percent in 1990s). The share of the value of raw materials exhibited a decreasing trend. It declined from 4.37 percent in the 1960s to 1.9 percent in the 1990s.

If we look at the growth in import bill (Dollar value at c.i.f.), total and non-fuel import bill have exhibited a declining growth (see Figure 3.7and 3.8). The growth in total import bill declined from about 12.5 percent in the 1960s to about 7 percent in the 1990s. Non-fuel import bill have similar trend to that of total import bill (declined from about 12 percent in the early 1960s to about 8 percent in the 1990s). The rate of decline was about 17.2 percent for total import bill and about 16.4 percent for non-fuel imports.

Figure 3.7 Trends in Percentage Growth in Total Import Bill (1962-2004)

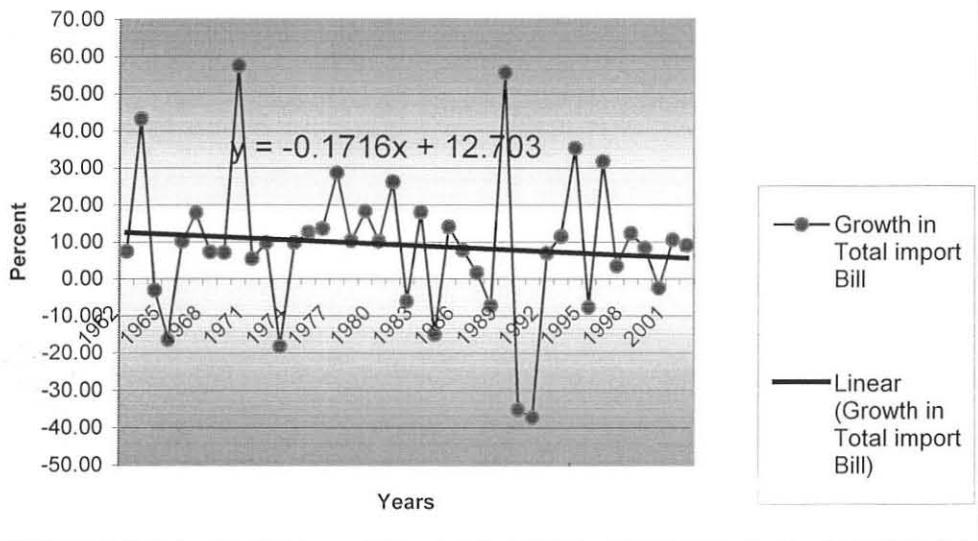
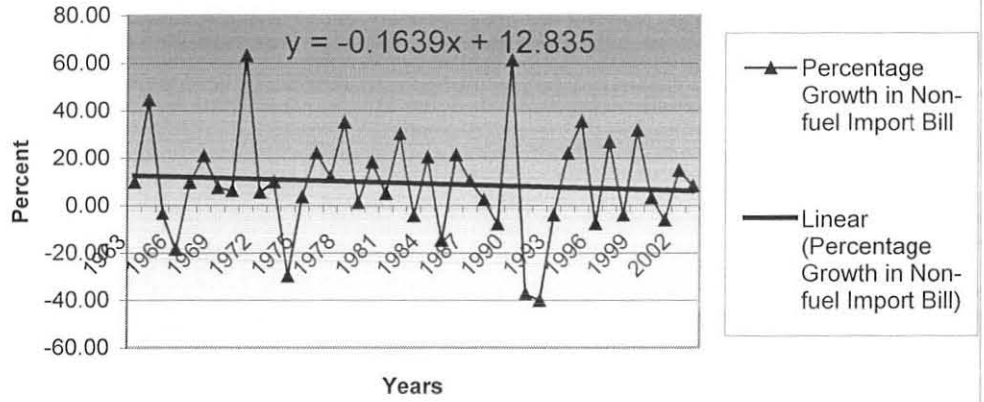


Figure 3.8 : Trends in Percentage Growth in Non-fuel Import Bill



Fuel import bill on the other hand, exhibited increasing growth (see figure 3.1). It increased from about 10 percent in the 1960s to about 12 percent in the 1990s. The rate of increase in growth was about 5.8 percent.

Figure 3.9: Trends in Percentage Growth in Fuel Import Bill

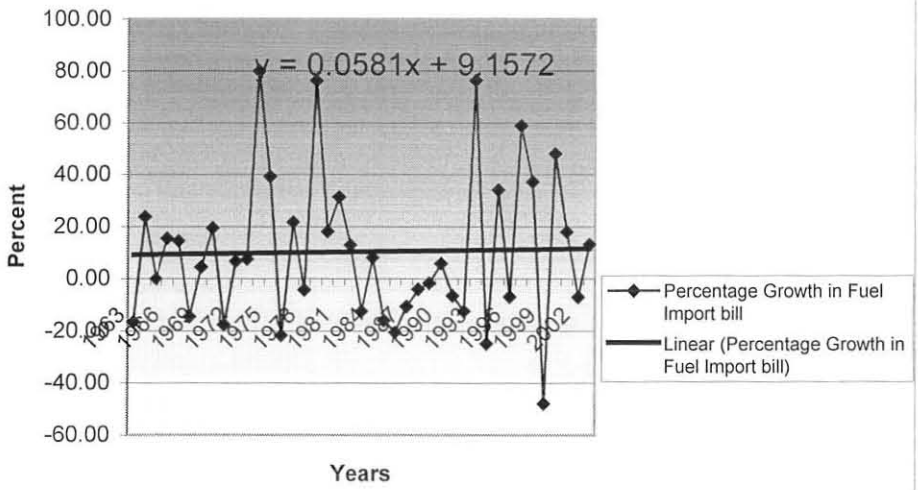


Table 3.6 shows the details in the percentage average growths of these commodities. The growth in total volume of

imports declined from 4.5 percent in 1960s to about 1.6 percent in the 1980s (its depression). The volume of imports had recovered in 1990s with highest growth rate of the four decades (33 percent). The overall average growth of imports in those four decades is about 10.6 percent.

Table 3.6 Percentage growth rate of volumes of merchandise imports in Ethiopia

Years	Raw materials	Semi finished products	Fuel	Capital goods	Consumer goods	Others	Total Growth in values	Total Growth in Volumes
1962-1971	14.45	10.75	98.77	23.25	12.81	31.9	13.85	4.51
1972-1981	11.97	10.42	43.19	17.65	9.59	55.55	8.6	4.86
1982-1991	4.00	3.64	-4.52	18.67	7.34	2261.79	6.00	1.59
1992-2003	18.10	26.96	35.00	18.06	27.00	481.51	21.21	32.8
Overall Average	12.72	13.94	43.75	19.82	15.16	713.92	13.15	10.56

Source: - Own Computation Based on Data From Customs Authority

These figures suggest that Ethiopian imports, although fluctuating, have been expanding both in volume and value terms in the past four decades. This in turn suggests the growing dependence on foreign goods.

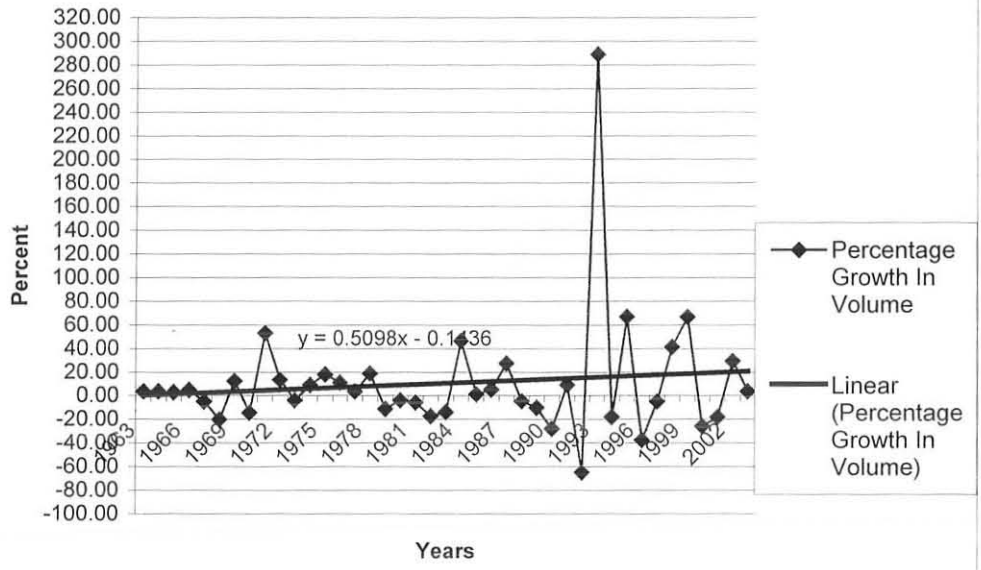
The reason for the declines from 1960s to 1980s could be due to protective and import substitution policy (in ward oriented policy) the governments was following. The other reason is the import of merchandise diverted to weapons due

the civil war persisted until 1992. The expansion of imports in the 1990s is due to the reform implemented starting in the early 1990s. Liberalization of the domestic market, increases in the levels of domestic economic activity and tariff rationalization are among the other factors that contributed to this expansion. However, this growth in the 1990's is contrary to what was expected by devaluation of the domestic currency. The reasons could be the expansion of economic activities following series of reform measures in the domestic and external sectors of the economy.

These observations are in line with what is suggested by Porter and Ranny (1982) and others that in many developing countries the demand for imports is inelastic.

The figure in Annex 3.3 shows the trend in the volume of imports in the past four decades. The rate of growth from 1993 onwards (although fluctuating) is accelerated growth. This accelerated growth can be easily seen in figure 3.10. The growth in the volume of merchandise imports increased from about 2 percent in the 1960s to about 20 percent in the 1990s. The rate of growth the growth is given by the slope of the linear trend line, which is about 0.5.

Figure 3.10: Trends in the Percentage Growth in the Volume of Imports



3.3 Direction of External Trade

The major trade partners of Ethiopia (according to the percent share of exports and imports) are Germany, Italy, USA, Japan, Saudi Arabian, UK, France, and Djibouti. Ethiopia exports about 70 percent of exports to these countries and imports about 55 percent of imports. The country exports 29 percent of the exports to rest of the world (including Sudan, Kenya, Netherlands, Russia, China, and others) and imports about 45 percent of the imports from the rest of the world (see Annex 3.4).

Ethiopia is in trade deficit almost with all of its trade partners. Except Djibouti, the country's exports finance not more than about 40 percent of the imports (see table 3.8). Individually exports to major trade partners: Germany, Italy, USA, Japan, UK, Saudi Arabia and France

financed about 95, 78 40, 45, 23, 35 and 62 percent, respectively of total imports from these countries in the 1990s (see table 3.7). When we compare the two decades (1980s and 1990s): for China P.Republic declined from 74 percent in the 1980 to 2.3 percent in 1990s, for USA, Saudi Arabia and Russia from 108, 907 and 33 in the 1980s declined to 40, 35 and 2.7 percent in the 1990s, respectively. In the 1980s direction of trade was to former socialist countries: in the 1990s it expanded to include other countries.

When we see trade between the neighbors: Kenya, Djibouti and the Sudan, except with Kenya, the others are in trade surplus. With Kenya it is a large deficit. Exports to Kenya financed about 2.9 of imports in 1980s and 7 percent in the 1990s.

This implies that the country is a net importer from most of its trade partners. This suggests the need to follow bilateral trade negotiations and export promotions in order to narrow the bilateral trade deficits between each of the trade partners.

Table 3.7. Direction of External Trade, Exports as percent of imports

Years	1975-1979	1980-1991	1992-2003
Djibouti	3166.9	1254.2	132.7
Kenya	0.0	2.9	7.0
Sudan	0.0	816.5	225.1
U.A.R	13013.3	2061.0	14.7
France	85.9	89.1	62.3
Germany	108.0	64.2	94.8
Italy	40.4	49.4	77.6
Netherlands	118.7	75.6	21.3
U.K.	32.1	16.4	23.1
Russia	52.6	33.1	2.7
Yugozlavia	263.4	2.6	163.1
U.S.A.	274.5	108.0	40.2
China, P.Rep.	99.2	74.1	2.3
Japan	45.1	48.2	74.5
Saudi Arabia	904.6	907.5	35.0
Rest of the World	50.6	23.4	21.3
Total	85.6	48.8	38.1

3.4 Trade Policies in Ethiopia

When discussing trade policy in Ethiopia one should consider three regimes (MEDaC, 1995 and 1999). The first is the pre 1974 era where we have open market economy with fixed exchange rate. The second is the period between 1973 and 1992 where we have planned inward oriented economy with fixed exchange rate. The third is the period after 1992, which is open and characterized by series of reform measures.

In this section tariff and non-tariff policies that have direct and indirect influence on exports and imports of goods and services (in the three regimes) are discussed. The basic economic fundamentals in this area are: exchange rate, direct or indirect control of foreign exchange

(rationing and restrictions) tariffs and non-tariff trade barriers, import and export subsidies, and state trading.

3.4.1 Foreign Exchange rate

Exchange rate regime is one of the key economic fundamentals that should be considered when studying exports and imports as well as trade policy. Exchange rate changes and exchange rate variability affect volume of trade and the related trade variables. The effect of inappropriate exchange rate regime is a vicious circle. It may result in low export performances. Low export performances in turn reduce capacity to import essential foreign capital goods and production inputs thereby reducing future production and exports.

According to the literature the impact of changes in exchange rate on exports and imports (the trade balance) depends on the elasticity of export and import demand.

There had been three exchange rate regimes in Ethiopia during the past four decades. The first was the period before 1973 where the economy was open with frequent revaluation of the exchange rate and the second regime was the period between 1973 and 1992 where we have fixed exchange rate with more of inward oriented economic policy. During the period 1973-1992 there were frequent intervention in the external sector in the form of foreign exchange allocation (rationing) and direct control or discriminating between importable items. The third is the period after 1992 to date, which was characterized by series of outward oriented economic reform policy actions. In October 1992 the Birr was devalued by 142 percent to

Birr 5 per US dollar. The devaluation was followed by biweekly auction except for some commodities (petroleum, pharmaceutical products, fertilizer, external debt servicing, and government contributions to international organizations and foreign offices) for which the official rate was allowed (Feleke 1995) and later in 1998 fully liberalized. In this period packages of (including liberalization) reform measures were introduced.

Several studies confirm that Ethiopian exchange rate had been overvalued and misaligned from its fundamental equilibrium level particularly during the period 1973 to1992. The governments maintained an overvalued real exchange rate for it was seen as a convenient means to complement quotas and tariff barriers. Overvalued exchange rate was maintained as part of import substitution strategies in order to increase protection of highly import dependent industries (Sekkat and Varoudakis, 1998, MEDaC, 1996, et al.). According to these studies (Feleke, 1995, Haile, 1994) the misalignment was higher in the 1970's and 1980's reaching up to 45 percent (MEDaC, 1996; Feleke, 1995). This had eroded the performance of exports making exports less competent in the international market consequently resulting in eroded capacity to import.

3.4.2 Tariff and Non-tariff Trade Barriers

Like the exchange rate there had been three trade policy regimes in Ethiopia during the past four decades (the periods before 1974, between 1974 and 1992, and after 1992). The periods before 1974 and after 1992 are more or

less similar for there was liberal trade policy. The period between 1974 and 1992 was inward oriented planed economy. This section will discuss tariff and non-tariff barriers of trade prevailed during these periods.

Regarding *tariffs*, it is better to review tariff structure in the three periods: the periods before 1974, between 1974 and 1992, and after 1992.

During the period before 1974 excise taxes were levied on petroleum products and goods imported or manufactured within Ethiopia and destined for consumption. Crude and partly refined petroleum destined for further processing, petroleum products used by airlines, fuel used for agricultural tractors, machineries, and other similar items were exempted from excise tax. Goods imported were levied 12 percent, goods exported 2 percent and goods manufactured locally were levied 5 percent transaction tax while imported agricultural and industrial machinery, implements, appliances or parts thereof, re-exports, intermediate goods manufactured in Ethiopia, and goods manufactured for export were exempted (MEDaC, 1995).

There were about 14 broad classes of importable and exportable goods subjected to specific import tariffs. All agricultural goods exported were subjected to export specific duty of from Birr 0.15 to Birr 5 per specified unit. There was also additional specific surtax on coffee export (Ibid).

During 1974 to 1992 excise taxes were levied on petroleum products and lubricants. Transaction taxes were levied on goods imported, exported, and goods manufactured locally.

The rate was further increased in 1979 for revenue purposes.

Table 3.8. Comparison of Taxes and export duties in 1963 and 1979

	1963	1979
Goods imported	*12%*	*18%*
Goods Exported	*2%*	*2%*
Goods manufactured locally	*5%*	*7%*

Source: MOFED 2001

Specific coffee surtax was further increased in 1989. Import duties range 0 to 230 percent. There were more than 160 items in specific duties, 25 tariff brackets, and wider tariff dispersion. Many inputs and intermediate goods for manufacturing sector were zero rated while the final products were taxed. Inputs and intermediate goods for manufacturing sector were zero rated whereas the final products were taxed. There was secondary tariff such as sales tax of 24 percent on imported and 12 percent on domestic products with 12 percent tariff equivalent (MEDaC, 1995).

The final result of these higher taxes was cost price distortions and together with the overvalued exchange rate it resulted in less competitiveness of exports in the international market.

The period after 1992 was characterized in series of tax and tariff reform measures. Custom tariff was revised; the concept of effective rate of protection was introduced. During this period, duties, which previously range 5-230 percent, are reduced to 5-80 percent. Accordingly the weighted average tariff rates are substantially reduced to 24 percent. The number of tariff brackets tightened from 25

to 10. Specific duties were replaced by ad valorem rates. Unnecessary exemptions were removed, and the 2 percent transaction tax for non-coffee exports was cancelled. The mean tariff rate and the level of dispersion are reduced. Accordingly about 54 percent of the products fall in the range 40 to 65 percent category while more than 51 percent fall in between 5 to 15 percent tariff categories *(MEDaC, 1995)*.

The government had also introduced a duty draw back scheme whereby exporters are refunded the tax and duty they paid on the inputs they used in production of the export commodities *(ibid)*.
These measures are expected to relieve some of the cost price distortions significantly

With regard to non-tariff barriers reference can be made for the three periods discussed for tariff and exchange rate. Non-tariff barriers were magnified during 1974 to 1992. During this period foreign exchange was allocated centrally with long delays to get licenses and foreign exchange for imports (especially for the private sector). There were about 450 list of commodities banned from importing. The imports of most consumer goods were seriously restricted since 1977 through foreign exchange regulation notice for balance of payments reasons *(MEDaC, 1995)*.
In *the period after 1992,* lengthy import and export licensing system was made to be simplified and transparent. During this period the government devalued the currency by 142 percent, set floor price for coffee export, and abandoned the direct financial subsidy on exports. Private

exporters were encouraged removing state monopoly on exports, and new investment code was introduced that provides tax and non-tax incentives for investors in the manufacturing and agricultural sector.

In general these liberalization measures have resulted in rapid growth in the volume of imports and trade deficit. Volume of imports has grown by 33 percent in the 1990s compared to 1.6 in the 1980s. This surge in imports could also be due the expansion of domestic economic activity. The surge in imports suggests the need to increase in the volume of exports through export promotion measures in order to minimize the trade deficit.

4. SPECIFICATION OF THE MODEL, ESTIMATION TECHNIQUES AND THE DATA

4.1 Specification of the Model

Hemphill (1974) developed a model that could explain the behavior of imports under foreign exchange constraint. This model was extended by Winters and Yu (1985) and modified further by Moran (1988). It is based on the assumption that economic agents and macroeconomic authorities in each country minimize the cost of adjustment to the long run level of imports to be equal to the long run level of foreign exchange receipts by using foreign exchange reserves to smooth imports. In other wards the model assumes stationary equilibrium.

The model is derived from explicit optimization problem of quadratic cost function of the form:

$$C_t = b_1(M_t - M_t^*)^2 + b_2(R_t - R_t^*)^2 + b_3(M_t - M_{t-1})^2 + b_4(M_t - M_t^d)^2 \qquad (1)$$

Where:

M_t^d stands for the traditional (the benchmark import demand model) import demand curve,

M_t represents actual level of current imports,

M_t^* denotes long run equilibrium levels of imports,

M_{t-1} denotes lagged level of imports,

R_t represents the current level of foreign exchange reserves,

R_t^* denotes desired level of foreign exchange reserves,

t stands for time

The traditional (bench mark) import demand curve is given by

$M_t^d = a_0 + a_1(P_m/P_d) + a_2Y_t$ (2)

Where: P_m= import price index, P_d = domestic price index, and Yt = income and a_i are parameters

The desired level of international foreign exchange reserves is related to the desired level of imports by level of imports as:

$R^* = a_0+a_1M_t^*$ (3)

Where: $0 \leq a_1$,

It is assumed that in the short run they are related by the balance of payments identity:

$\Delta R_t = F_t - M_t$ (4)

Where F_t represent real level of foreign exchange receipts

Further it is assumed that:

$F_t^* = F_t + \lambda\Delta F_t = (1+\lambda) - \lambda F_{t-1}$ (5)

Where F_t^* the long run (desired) level of foreign exchange receipts and λ indicates how changes in foreign exchange receipts are perceived. If λ is positive the changes are perceived to be permanent. If λ is negative, the changes are perceived to transitory.

It is assumed that in the long run stationary equilibrium:

$M_t^* = F_t^* = M_t = M_t^d$

After substitution equation (2) and equation (3) in equation (1) and solving the first order condition of the cost minimization problem subject to the budget constraint

given by equation 4 will give the mathematical model for import demand, which is given by:

$$M_t = b_0 + b_1 F_t + b_2 R_{t-1} + b_3 M_{t-1} + b_4 (\frac{Pm}{Pd}) + b_5 Y_t \qquad (6)$$

The theoretical foundation of this model lies on that the basic objective of economic agents in a foreign exchange constrained economy is to minimize the deviations between actual and desired levels of imports and international reserves (Hemphill, 1974). The model assumes the long run level of foreign exchange receipts (F_t^*) to be equal to the long-run level of imports (M_t^*). F_t^* can estimated from recent data based on the notion that the future is likely to be reflected from developments in the past. This implies if short run foreign exchange receipt (F) remains fairly constant overtime, it can be equated with long run foreign exchange receipts (ibid).

The increasing trade deficit and the stagnating performance in exports in the face of increasing imports suggest that the Ethiopian economy is under foreign exchange constraint. For these reason, it is hypothesized that the availability of foreign exchange and the factors that affect its availability and demand are important variables to explain imports. Therefore the real exchange rate (proxy for the relative prices), the level of economic activity (proxied by Real GDP), foreign exchange earnings, levels of international foreign exchange reserves, and lagged level of imports are considered to be major variables that can robustly explain real level of imports in a given period.

Accordingly, the econometric model for this study, following Moran (1988), Egwaikhide (1999), Yuan and Kochar (1994), Hemiphill (1974) and others takes the form:

$$M_t = b_0 + b_1F_t + b_2R_{t-1} + b_3M_{t-1} + b_4(\frac{Pm}{Pd}) + b_5Y_t + u_t \qquad (7)$$

Where u_t is white noise disturbance (error) term.

In this study it was not possible to get data on the relative prices (P_m/Pd). For this reason the real exchange rate (RER_t) is used as a proxy for relative prices (P_m/Pd).

Taking the logarithm of the variables and adding dummy variable for trade policy changes takes the form:

$$LnM_t = b_0 + b_1LnF_t + b_2LnR_{t-1} + b_3LnM_{t-1} + b_4Ln(RER_t) + b_5LnY_t + Dumy + u_t \qquad (8)$$

Where:

Ln =the natural logarithm

M = the level of Volume of imports in time

F = the level of Foreign exchange earning

RER =The Real R = Level of foreign exchange reserves

Exchange Rate

Y = Real GDP (proxy for level of domestic economic activity)

Dumy =Dummy Variable for trade policy change

The Subscript t = time

For further refinement of the results obtained from estimation of the general model given in equation (8) and test whether what is true of the whole is true of the components separate models for consumption goods, capital goods and raw materials semi finished products is are specified. This helps identify whether the determinants of imports will vary with the commodity categories: capital

goods, consumption goods, and raw materials and semi finished products. These models are specified as follows: -

1) Consumption goods: -

$$LnM_c = d_0 + d_1 LnF_t + d_2 LnR_{t-1} + d_3 LnMc_{t-1} + d_4 Ln(RER_t) + d_5 LnT_{ct} + h_t \quad (9)$$

Where,

M_c=imports of consumer goods, T_c = aggregate consumption expenditure, RER_t = real exchange rate, R_{t-1} = lagged level of foreign exchange reserves, F_t = level of Foreign exchange earnings, Mc_1 = lagged level of imports of consumer goods, Ln =the natural logarithm, Mc = the level of Volume of imports of consumption goods, R = Level of foreign exchange reserves and the Subscript and t = time

2) Raw Materials and Semi Finished Products: -

$$LnMRI_t = e_0 + e_1 LnF_t + e_2 LnR_{t-1} + e_3 LnMRI_{t-1} + e_4 Ln(RER_t) + e_5 LnY_{mt} + v_t \quad (10)$$

Where:

MRI_t = imports of Raw Materials and Semi Finished Products, F = level of Foreign exchange earnings, Y_m = GDP of the industrial sector, R_{t-1} = lagged level of foreign exchange reserves, MRI_{t-1} = lagged level of imports of raw materials and semi finished products and RER_t = the real exchange rate Ln =the natural logarithm, The Subscript t = time

3) Imports of capital Goods: -

$$LnMK_t = f_0 + f_1 LnF_t + f_2 LnR_{t-1} + f_3 LnMK_{t-1} + f_4 Ln(RER_t) + f_5 LnI_t + w_t \quad (11)$$

Where:

Ln =the natural logarithm, MK_t = the level of Volume of imports of capital goods, F_t = the level of Foreign exchange earning, R_t = Level of foreign exchange reserves, RER_t =The Real Exchange Rate, I_t = gross investment and The Subscript t denote time

4.2. Estimation Techniques

4.2.1 the Cointegration Relationship

If the variables are cointegrated their time paths may be influenced by the extent of any deviation from long-run equilibrium (Enders 1995; Johnston 1997; Intriligator et. al. 1996). That is the short run dynamics may be influenced by the deviation from the long-run relationship (ibid).

In this model we have a multivariate series in which all the variables are non-stationary and integrated of order one. Since it is a multivariate model, there may exist more than one cointegration relationship (Enders, 1995, pp.385).

According to Enders (1995), Johansson and Juselius (1990) maximum likelihood estimation procedure is expected to circumvent the use of two-step Engle-Granger estimators and can estimate and test for the presence of multiple cointegrating vectors "(Enders, 1995). It estimates the long-run relationships among the variables and provides the estimates of all possible cointegrated vectors that exist among these variables. It also tests for the number of cointegrated vectors.

Given that each series has a unit root (is non-stationary), we test whether the variables are cointegrated over the sample period and if so, what the cointegrating relation is. If we consider the unrestricted VAR of order p of the form:

$$Y_t = A_1 Yt_{-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + \beta X_t + e_t \qquad (12)$$

Where, Y represent Vector of non-stationary I(1) variables in this study, X_t denote the vector of deterministic variables, and e_t stands for vector of disturbances also called 'innovations'.

The VAR can be written as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Phi_i \Delta Y_{t-i} + \beta X t + e_t \qquad (13)$$

Where $\Pi = \sum_{i=1}^{p} A_i - I, \Phi = \sum_{j=i+1}^{p} A_j$

According to the granger causality theorem, if the coefficient matrix Π has reduced rank r<k, then there exists kxr matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' Y_t$ is stationary: r is the number of cointegrating relations (the cointegrating rank) and each column of β is the cointegrating vector; the elements of α being the adjustment parameters in the vector error correction model (Enders 1995; Johnston and DiNardo, 1997; Eviews Help, 1998)

First we estimate the Π matrix in unrestricted form and then 'test whether we can reject the restrictions implied by the reduced rank of Π (ibid).

If there is cointegration between the variables considered, then in the long run $\Pi Y = \alpha\beta' Y_t = 0$. Therefore, if these holds, the matrix $\beta' Y_t$ is a set of r error-correction mechanisms separating the long run and short run responses of the variables in the model[5].

For this VAR-based cointegration test, the methodology developed by Johansson (1991, 1995) is implemented. This

[5] One may expect that in the long run $\Delta Y_t = 0$; hence the equation $\Pi Y_t = 0$ can include the long run relationship between the variables.

method is aimed at testing the restrictions imposed by cointegration on the unrestricted VAR involving the series. The estimation provides estimate of eigenvalues or characteristic roots, the associated normalized eigenvectors or estimate of cointegrating vectors or relations, log likelihood Ratio and the critical trace statistics at one and five percent level of significance[6]. The test involves testing for the hypothesis of no cointegration relations, one cointegration relations, two cointegration relations and so on, all against the alternative hypothesis of full rank, that is all series in the VAR are stationary (Eviews Help, 1998,). That is, the number of distinct cointegrating vectors can be obtained by checking the significance of the characteristic root of Π, since the rank of the matrix is the number of characteristic roots significantly different from zero. If the variables are not cointegrated the rank of Π is zero all-characteristic roots being equal to zero.

The estimated cointegrated relation will give cointegrated coefficients, which are estimates of the log run elasticities.

---

[6] Given the eigenvalues λi, the trace statistics :

$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n} Ln(1-\lambda_i)\lambda(r, r=1) = -TLn(1-\lambda r+1)$, where λ = the estimated values of the characteristic roots(also called eigenvalues) obtained from the estimated Π matrix, T= the number of usable observations.

4.2.2 The Short Run Relationship: Error Correction Model

Granger causality theorem shown by Engle & Granger (1987)' suggests that any set of cointegrated time series has an error correction representation, which reflects the short run adjustment mechanism (ibid). Use of error correction model provides a way to separate the long run and short-run properties of the data.

The long run equilibrium relationship is estimated using OLS. The log run relationship is that given by equation (8) which is:

$$LnM_t = b_0 + b_1 LnF_t + b_2 LnR_{t-1} + b_3 LnM_{t-1} + b_4 Ln(RER_t) + b_5 LnY_t + u_t$$

In the next step, we estimate the error correction model. The residuals from equilibrium regression will be used to estimate the error correction model.

Therefore the error correction model takes the form:

$$\Delta LnM_t = \theta_0 + \sum_{i=1}^{n} b_{1i}\Delta \ln F_t + \sum_{i=1}^{n} b_{2i}\Delta \ln R_{t-1} + \sum_{i=1}^{n} b_{4i}\Delta \ln(RER) + \sum_{i=1}^{n} b_{5i}\Delta \ln Y_t + \gamma EC_{t-1} + e_t$$

(14)

Where:

$$EC_{t-1} = (1-b_3)\left[M_{t-1} - \gamma_0 - b_1 F_{t-1} - \frac{b_2}{1-b_3} R_{t-2} - \frac{b_4}{1-b_3}(RER_{t-1}) - \frac{b_5}{1-b_3} Y_{t-1}\right] + ec_t$$

(15) represent the error correction term based on the cointegration regression and $1-b_3$ represents the speed of adjustment. Where again $\gamma_0 = \frac{b_0}{1-b_3}$, and b_3 is the coefficient of $\ln M_{t-1}$ given in equation (2).

The value of the residual EC_{t-1} estimates the deviation from long-run equilibrium in period $(t-1)$; hence, estimate the

error correction model equation, (7)' using residuals from estimation of the long-run equilibrium relationship.

The error correction model in equation (7)', other things being equal, may give the two sources of current changes in imports: the one due to the changes in the explanatory variable considered the other the partial correction for the extent to which the first lag of imports deviated from the equilibrium value corresponding to the lagged value of the explanatory variables given by the equation for EC_{t-1}

4.3 Variable Definitions and Data sources

Attempt is made to use all relevant information and data that are necessary in understanding and analyzing imports and their determinants in Ethiopia. Time series data on economic fundamentals: -Real GDP, volume and value of imports and exports by category, total foreign exchange earnings, international foreign reserves, trade balance, direction of trade, terms of trade, real exchange rate, gross domestic investment, and total consumption expenditure at least in the period 1960 to 2004 are used. The sources of the data are National Bank of Ethiopia, Ministry of Finance and Economic Development, and Ethiopian Customs Authority.

For this study the following variable definitions apply:

Volume of imports in this study refers to the quantity of imports in metric tones within a given year.

Foreign exchange earnings refer to the sum of export foreign exchange receipts, private transfers, and government grants (official transfers) within a given year.

International foreign exchange reserves refer to the sum of gold and international foreign exchange assets of the monetary authorities within a given year.
Real Exchange Rate (RER) refers to the official nominal exchange rate converted into real value index within a given year.
Real GDP is nominal GDP within a given year deflated by the GDP deflator.

4.4 Characteristics of the Data

The data was obtained in units of millions. For graphing and analytical purposes the data was changed into logarithms. This is done based on technical econometric recommendation.

The plots of the volume of imports and foreign exchange reserves fluctuate together. In most cases of fluctuations of the values when the lag of foreign exchange reserves is decreased the volume of imports also decrease and when foreign exchange reserves increase volume of imports also increases suggesting positive cause and effect relationship between them. This is true also for real GDP and volume of imports. Although with different rate they increase together.

The real exchange rate and the level of imports seem to have a negative relationship. In most cases increase in

imports is accompanied by decrease in the real exchange rate. For foreign exchange earnings there is no uniform positive relationship rather there seem to be negative relationship. The reason may be that macro economic authorities gave priority to that level of foreign exchange reserves in deciding to give license to imports during most of the sample period.

In the case of real GDP and import there is no clear simultaneous movement. While real GDP has more or less steady increase imports have a fluctuating movement. This suggests that Real GDP may not be appropriate explanatory variable for imports.

However, one can generalize that the plots of the series are drifting together suggesting the presence of cointegrated relationship between the variables.

4.5 Estimation Methods

Estimation and diagnostic tests are made using Eviews soft wares. The estimation method employed is Ordinary Least Squares (OLS).

5.ESTIMATION RESULTS

5.1 Diagnostic Tests

Test For Unit Root: - The data used for estimation is the period covering the years 1960 to 2004. The logarithm of the data was plotted against time. Although with different slope the plot of the series are drifting together suggesting the presence of non-stationarity and cointegrated relationship between the variables.

The major problem associated with time series data is that most data exhibit time characteristics (non-stationarity of the series) that may lead to a spurious and/or biased regression results making statistical inference invalid.

For evaluating the stationerity of the variables or tests for unit root the Augmented Dick-Fuller (ADF) is employed. The test for unit root involve specifying model of the variables of the form: $X_t = a_0 + a_i X_{t-I} + e_t$; Where X_t is the variable to be tested, i is the lag length and e_t is random disturbance (white noise) term. The test involves testing the null hypothesis a_1 is equal to one.

Accordingly, Augmented Dick-Fuller (ADF) test for the unit root at levels did not reject the null hypothesis that there is a unit root for all the variables considered (Volume of imports and the categories, real GDP, Real Exchange Rate, Foreign Exchange Earnings and Internationals Foreign Exchange Reserves, Gross investment, Total consumption expenditure and GDP of the industrial sector). But for the first difference the Augmented Dick-Fuller

(ADF) test rejects the null hypothesis that there is a unit root at one, five and ten percent level of significance. This means that there is evidence that the data for all the variables are integrated of order one. The results of this test are summarized in annex 5.1.

Test for Granger Causality: - A variable Y is said to be granger caused by another variable X if the current values of Y can be predicted with better accuracy by using past values of X. In other words the Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. Equivalently we need to test if the coefficients on the lagged x's are statistically significant.

Two-way causation is frequently the case- x Granger causes y and y Granger causes x. The statement "x Granger causes y" does not imply that y is the effect or the result of x (Enders, 1995; Yuan and Kochhar, 1994). Granger causality measures precedence and information content but does not by itself indicate causality (ibid). It is recommended that in practical exercise it is better to use more rather than fewer lags, in order to take in to account of all past information.

We runs bivariate regressions of the form:

$Y_t = a_0+a_1Y_{t-1}+\ldots+a_1Y_{t-i}+\ldots+biX_{t-i}$

$X_t = a_0+a_1X_{t-1}+\ldots+a_1X_{t-i}+\ldots+biY_{t-i}$

The reported F-statistics are the Wald statistics for the joint hypothesis $a_1 = \ldots = a_i = 0$ for each equation. The null hypothesis is therefore that x does not Granger-cause y in

the first regression and that y does not Granger-cause x in the second regression.

Consequently, the test for granger causality at 12 lags is given in Annex 5.2. The null hypotheses that the coefficients of lagged Real Exchange Rate (LRER) and LRGDP are zeros, which says RER and RGDP does not Granger cause Volume of imports is rejected. This means that there is evidence that the past and present values of RER and Real GDP can help to explain and predict volume of imports. This finding is in line with the theoretical expectation.

The result of the test for the foreign exchange earnings is the other way round. The null hypothesis that foreign exchange earnings do not granger cause imports is not rejected while the null hypothesis that volume of imports do not granger cause foreign exchange earnings is rejected. This probably be due to the fact policy makers give priority for the levels of reserves and that any surplus foreign exchange earnings is maintained as reserves to make the level reliable rather than allocating for immediate importing. This is reflected in the rejection of the null hypothesis that international reserves do not granger cause foreign exchange earnings. This also reflects endogenity of foreign exchange reserves to foreign exchange earnings. This may imply that lagged level of foreign exchange earnings can help in explaining and prediction of foreign exchange reserves. This again implies there could be foreign exchanges back payments, which causes foreign exchange earnings not to cause imports directly. The causal relationship could be foreign exchange earnings via foreign exchange reserves. The other reasons could be the level of

reserves may trigger policy makers to find additional foreign exchange earnings from different sources and maintain reliable level of foreign exchange reserves.

The causal relationship between international reserves and imports is found to be near indeterminate. This could be due to the reason that the lagged level of foreign exchange reserves and vice versa have equal significant two-way causation.

Similarly the granger causality test for foreign exchange earnings and real GDP, and international foreign exchange reserves and real GDP is indeterminate. This was expected. There may not be robust direct causation between real GDP and foreign exchange earnings as well as reserves. Real GPP may cause foreign exchange earnings; however, since export performance is low during the period the main sources of foreign exchange earnings are official government transfers, private transfers and loans. For these reasons we do not expect past and present values of foreign exchange earnings (LFXE) and international foreign exchange reserves (LIFXR) to explain and predict real GDP and vice versa.

5.2 Cointegration Test and Estimated Cointegrated relations: Long-run Behavior of Imports

As it is discussed in section 4.2 Johansson (1988) and Johansson and Juselius (1990) have shown how to find a maximum likelihood estimate for α and β in multivariate model. It is based on maximum likelihood ratio tests of the

hypothesis that there is at most *r* cointegrated relationship among the variables considered. The test is based on the maximal eigenvalues of stochastic Π to test the null hypothesis that the number of cointegrated vectors is less than or equal to *r* against the alternative of *r+1* cointegrating vectors.

The estimated cointegrated relation will gives cointegrated coefficients, which are estimates of the log run elasticities of imports with respect to the changes in the explanatory variables considered.

Accordingly, the number of cointegrated vectors for imports, international reserves, the real exchange rate (RER), and real GDP is tested. The test statistics are given in Annex 5.3. Assuming no deterministic trend in the data it can be concluded that there are 2 cointegrated equations at five percent level of significance. That is log likelihood ratio test indicates 2 cointegrating equation(s) at 5% significance level. All have the expected sign

The estimated cointegrated relation gives the estimated long run elasticities of each of the variables under consideration. Accordingly, there is evidence that the long-run elasticity of imports with respect to international reserves is about 0.22 whereas those of real exchange rate and real GDP are 0.44 and 0.87, respectively. These findings are comparable and close to estimates by Moran (1988). These results are summarized in table 5.1

Table 5.1 Estimated long run elasticity of import demand

	Foreign exchange reserves	Real Exchange Rate	Real GDP
Elasticity	0.22	0.44	0.87

Normalized Cointegrating Coefficients: 1 Cointegrating Equation(s). Log. L. Ratio = 170.6

Since linear combination of non- stationary (cointegrated of the same order) variables is stationary: the existence of cointegrated relationship implies that the regression of non-stationary series in their levels will yield meaningful (not spurious) results. Hence, the variables as they appear at levels were estimated with dummy variable for trade policy change. The dummy variable takes values zero during the period between 1974 and 1992 and one otherwise. The estimation results are reported in annex 5.3.

The foreign exchange earnings let out of the model because of inconsistency and unexpected negative sign may be due to its exogenity to international foreign exchange reserves as reported by the granger causality test in the previous section. Moreover, the omission of foreign exchange earnings does not reduce the explanatory power of the other variables.

There is evidence that the estimated coefficients for international foreign exchange reserves (LIFXR (-1)), real exchange rate (LRER) and real GDP (LRGDP) are with expected signs.

The elasticities of international foreign exchange reserves and real GDP are significant and with expected signs. The elasticities are about 0.15 for international reserves and 0.86 for real GDP. These figures are close to what was

estimated above for long run elasticities in testing for cointegrated relation (table 5.1 above).

The dummy variable for changes in trade policy assuming no slope change has significant coefficient (Annex 5.4). This implies that there was structural break due to trade policy regime changes during the referred periods. This is consistent with chow breakpoint test, which suggested structural breakpoint starting in 1993. This implies liberalization of the external sector have positive impact on flow of imports.

LVOM=-0.39+0.14LIFXR(-1)-0.24LRER+0.86LRGDP-0.16DUMMY
t-stat (-0.35) (3.4) (-1.38) (6.23) (2.1)
Std-error(1.1)(0.042) (0.1706) (0.138) (0.0786)

R^2 = 0.86 Adjusted R^2=0.84, F-statistic=59.82 DW=1.7

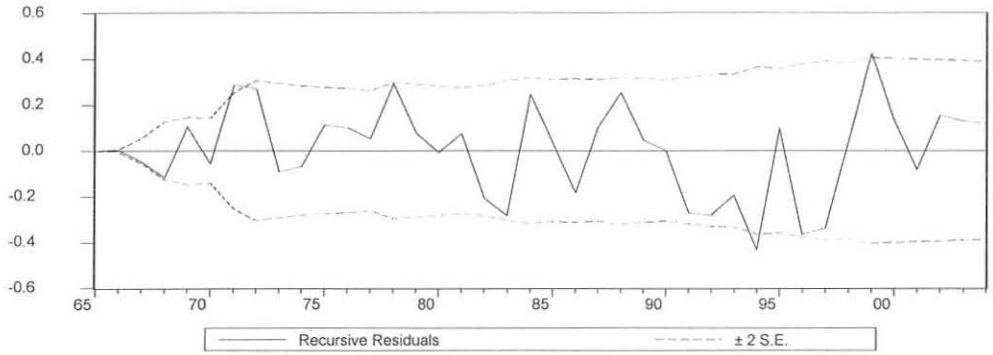
Where: LVOM= Ln of Volume of imports, LRGDP = Ln of real GDP, LRER = Ln of Real Exchange Rate, IFXR = Ln of International Foreign Exchange Reserves and Dumy= Dummy variable for trade policy regime

Parameter stability Test

To test stability of parameters obtained in the estimation CUSUM and CUSUSQ tests are used. The first option in this test is a plot of recursive resiuduals[4]about the zero line. Plus or minus two standard errors are also shown at each point. The residuals out side the standard error bands suggest instability in the parameters of the equation (see figure 5.1). The figure shows except at two points the plot of the residuals are within (between) the two standard

[4] Using Least Squares (OLS) the equation is estimated repeatedly, using ever-larger sub sets of the sample data. The one step ahead forecast error is resulting from this prediction is defined to a recursive residual (Eviews Help, 1998).

error bands. This suggests the stability of the estimated parameters.



Figur5.1 Recursive Residual plot

The second option is CUSUM test, which is based on the cumulative sum of the recursive residuals. The test plots the cumulative sum of the residuals together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between two critical lines. That is, movement outside the critical lines is suggestive of coefficient instability which in this case (see figure 5.2 a) the test does not indicate instability of the estimated parameters. That is the cumulative of the residuals lies between the two critical lines.

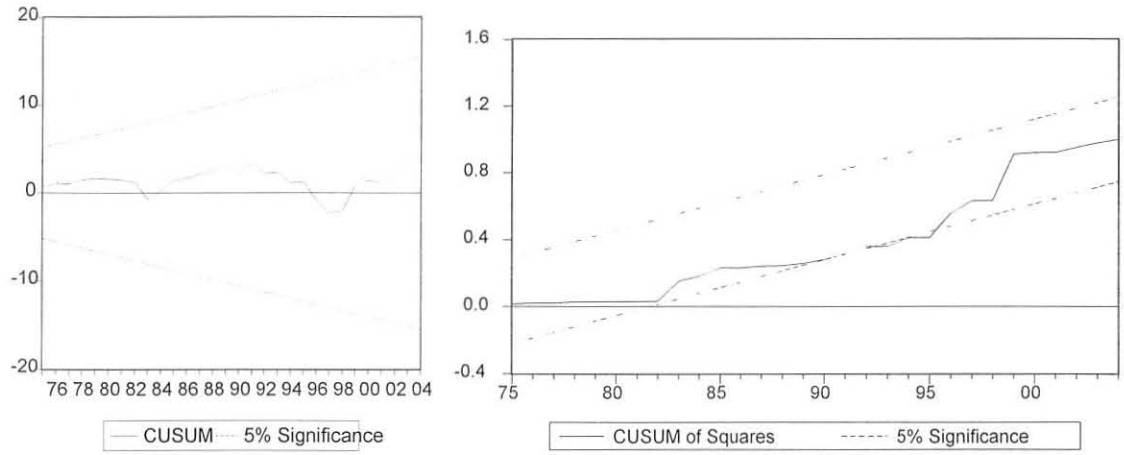
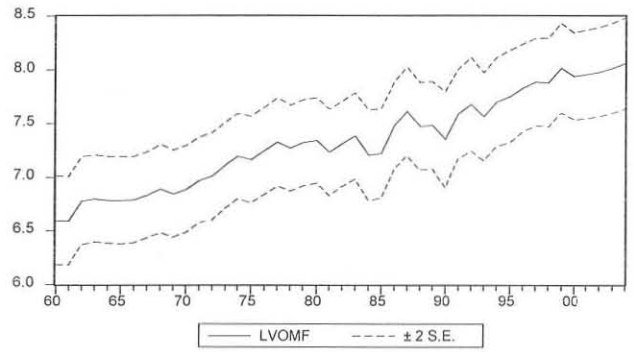


Figure 5.2- stability Test a) CUSUM test b) CUSUM of Square Test

The third test option is CUSUM of Square Test. It provides a plot of the test against time and the pair of 5 percent critical lines. As with the CUSUM test, movement outside the critical lines suggestive of coefficient or variance instability, which in this case does not. See figure 5.2 (b) above.

Test for Forecasting Capacity of the Estimated Model

To check for the viability of the estimated model we test for forecasting capacity of the selected model. The forecast plot is given in figure 4.3 below. The forecast is between plus or minus two standard error lines, which implies the model is viable for forecasting.



Forecast: LVOMF	
Actual: LVOM	
Forecast sample: 1960 2004	
Included observations: 45	
Root Mean Squared Error	0.183280
Mean Absolute Error	0.151229
Mean Abs. Percent Error	2.057947
Theil Inequality Coefficient	0.012466
Bias Proportion	0.000000
Variance Proportion	0.043150
Covariance Proportion	0.956850

Figure 5.3: - Forecast test for Imports

5.3. The Short Run Behavior of Imports

To observe the short-run properties of imports we use the error correction model. In this section we present the estimation result of the error correction model:

$$\Delta LnM_t = \theta_0 + \sum_{i=1}^{n} b_{1i}\Delta \ln F_t + \sum_{i=1}^{n} b_{2i}\Delta \ln R_{t-1} + \sum_{i=1}^{n} b_{4i}\Delta \ln(RER) + \sum_{i=1}^{n} b_{5i}\Delta \ln Y_t + \gamma EC_{t-1} + e_t$$

General to specific technique of model selection was used to specify the error correction model taking into account the principle of parsimony.

The estimation results are reported in table 5.2. The results suggest that the level of foreign exchange reserves (denoted by DLIFXR) play significant role in shaping the short run behavior of imports during the period 1960 to 2004. In other words, there is evidence that the level of foreign exchange reserves best explain the short run level and behavior of imports. The short run elasticity of imports with respect to international foreign exchange reserves is estimated to be about 0.15, which is less than the estimated long run elasticity. This result is higher than Moran's (1988) estimation (which is 0.1).

There is also evidence that the one periods lagged level of imports (denoted by $DLVOM_{(-1)}$) has helped to explain current level of imports with estimated elasticities of 0.68. The coefficient of changes in the real exchange rate (denoted by DLRER) and Real GDP have the expected sign. However, there is no sufficient evidence that real exchange rate and Real GDP have significant influence on level of changes in imports in short-run. This confirms Hemphill's (1974) conclusion that in foreign exchange constrained economies relative prices (here proxied by Real Exchange Rate) and economic activity (proxied by real GDP) do not robustly influence the level of imports while the foreign exchange reserves do.

The coefficient of the dummy variable is insignificant and has negative sign.

Table 5.2. Estimation results of the error correction model

Dependent Variable = DLVOM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.029102	0.045216	0.643627	0.5243
DLVOM(-1)	0.682088	0.265154	2.572417	0.0148
DLVOM(-2)	0.180251	0.159187	1.132319	0.2657
DLIFXR(-1)	0.154737	0.053060	2.916282	0.0063
DLRER	-0.027154	0.252253	-0.107645	0.9149
DLRGDP	0.293373	0.783367	0.374502	0.7104
DLRGDP(-1)	0.615127	0.642005	0.958135	0.3450
DUMY	-0.020922	0.065626	-0.318806	0.7519
EC_{t-1}	-0.516994	0.340748	-4.260330	0.0002
R-squared	0.686154			
Adjusted R-squared	0.661585			
Durbin-Watson stat	1.971810			

Where: **DLVOM**= first difference of Ln of Volume of imports, D**LRGDP** = first difference of Ln of real GDP, DLRER = first difference of Ln of Real Exchange Rate, D**IFXR** = first difference of Ln of International Foreign Exchange Reserves, and $\mathbf{EC}_{t-1}$ = first lag of the error correction term (residual series) and the numbers in brackets denote the lag length

The coefficient of the error term (speed of adjustment) in this error correction model is found to be significantly different from zero implying error correction representation. That is imports respond to the deviations from long run equilibrium. This suggests there is evidence that imports converge to the long-run equilibrium relation ship. It shows the speed at which aggregate imports adjust to foreign exchange availability in the long run.

The model was re-estimated after removing the insignificant variables. The result is the same. However, the coefficients have decreased (see the following table).

$$\mathbf{DLVOM = 0.0047 + 0.491DLVOM(-1) + 0.141DLIFXR - 0.39EC_{t-1}}$$

t.stat.	**(0.179)**	**(2.512)**	**(2.957)**	**(-4.771)**
S.error	(0.0263)	(0.198)	(0.0477)	(0.251)

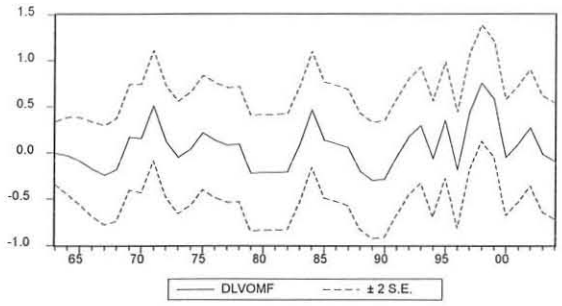
R-squared = 0.642645, Adjusted R-squared = 0.599771
DW = 2.047782

Where: **DLVOM**= first difference of Ln of Volume of imports, **DIFXR** = first difference of Ln of International Foreign

Exchange Reserves, and EC_{t-1} = first lag of the error correction term(residual series)

This result rejects the hypothesis that current level of the real exchange rate (RER) and real GDP significantly influence current level of imports whereas that of international foreign exchange reserves and lagged level of imports is not rejected. Foreign exchange earnings were excluded from the model due to its exogenity to foreign exchange reserves and its unexpected negative sign.

Test for Forecasting Capacity of the Estimated Model: - To check for the viability of the estimated model we test for forecasting capacity of the selected model. The using dynamic forecast estimate, forecast plot is given in the following figure. The forecast is between plus or minus two standard error lines, which implies the model is viable for forecasting.



Forecast: DLVOMF
Actual: DLVOM
Forecast sample: 1960 2004
Adjusted sample: 1963 2004
Included observations: 42

Root Mean Squared Error	0.170108
Mean Abs. Percent Error	0.131078
Mean Absolute Percentage Error	170.6669
Theil Inequality Coefficient	0.363447
Bias Proportion	0.019643
Variance Proportion	0.037857

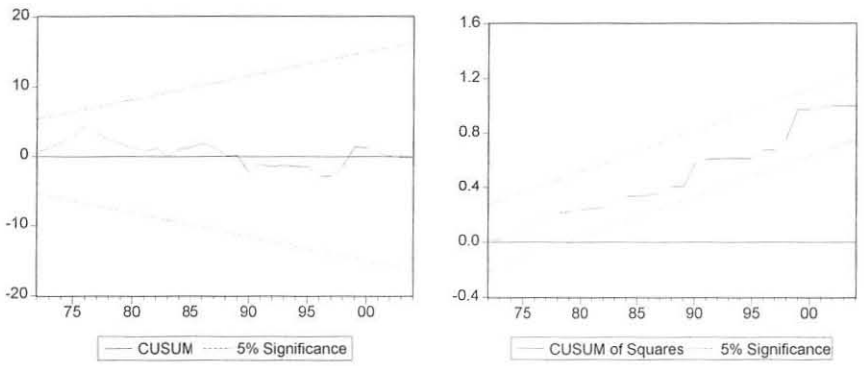
Figure: 5.4 Forecast tests

Test For Parameter Stability: -to test for the stability of parameters obtained in the estimation CUSUM and CUSUSQ tests will be used.

The first option is CUSUM test, which is based on the cumulative sum of the recursive residuals. The test plots

the cumulative sum of the residuals together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between two critical lines. That is, movement outside the critical lines is suggestive of coefficient instability. The second test option is CUSUM of Square Test. It provides a plot of the test against time and the pair of 5 percent critical lines. As with the CUSUM test, movement outside the critical lines suggestive of coefficient or variance instability.

The results of these two tests are given in the following figure (figure 5.5). The cumulative sum plot is between the critical lines for both of the test option.



a) b)

Figure : plots of a) CUSUM and b) CUSUM of square tests

5.4. Individual Import Categories

For further refinement of the results obtained from estimation given in the general model and test whether what is true of the whole is true of the components estimation for individual import categories was made. This will help identify whether the determinants of imports will vary with the commodity categories: capital goods, consumption goods, and raw materials and semi finished products.

5.4.1. Cointegration Test and Estimated Cointegrated relations: Long-run Behavior

Consumption goods: - the number of cointegrated vectors for consumer good imports, international reserves, the real exchange rate (RER), and real GDP is tested. The test statistics are given in Annex 5.5.
Assuming linear deterministic trend in the data it can be concluded that there is one cointegrated equation at five and one percent level of significance. That is log likelihood ratio test indicates 1 cointegrating equation at 5 percent level of significance.

The long run elasticities of imports of consumption goods with respect to changes in foreign exchange reserves, the real exchange rate and total consumption expenditure are 0.43, 0.01 and 0.52, respectively.

Table 5.3 Estimated long run elasticity of demand for imports of consumption goods

	Foreign exchange reserves	Real Exchange Rate	Total consumption Expenditure
Elasticity	0.43	0.01	0.52

Capital Goods: - the test for the number of cointegrated vectors for imports of capital goods, international reserves, the real exchange rate (RER), and gross investment, assuming no linear deterministic trend in the data, log likelihood ratio test indicates that there are three cointegrated equations at five and one percent level of significance (see annex 5.6).

The long run elasticities of imports of capital goods with respect to changes in foreign exchange reserves, the real exchange rate and gross investment are 0.39, 0.02 and 0.81 respectively.

Table 5.4 Estimated long run elasticity of demand for capital good imports

	Foreign exchange reserves	Real Exchange Rate	Gross investment
Elasticity	0.39	0.02	0.81

Raw Materials and Semi-finished Products: -the test for the number of cointegrated vectors for imports raw material and semi finished products, international reserves, the real exchange rate (RER), and GDP of the industrial sector, assuming no linear deterministic trend in the data, log likelihood ratio test indicates that there are two cointegrated equations at five percent level of significance (see Annex 5.7).

The long run elasticities of imports of capital goods with respect to changes in foreign exchange reserves, the real exchange rate and GDP of the industrial sector are 1.65, 0.05 and 0.2 respectively (see table 5.5).

Table 5.5 Estimated long run elasticity of import demand for imports of raw materials and semi-finished products

	Foreign exchange reserves	Real Exchange Rate	GDP of industrial sector
Elasticity	1.65	0.05	0.20

5.4.2 Short run Behavior: Short-run Elasticities of Demand for Imports

Consumption goods: The estimated results for the error correction model are reported on table 5.6. According to this estimate, there is no evidence that the coefficient of any of the variables (lagged level of reserves (DLIFXR) the real exchange rate (DLRER), level of consumption expenditure (DLTCE)) at first differences can significantly influence the changes in the volume of imports of consumer goods (DLCOG). That is although they have the expected sign, the short run elasticities are not significantly different from zero.

However, the coefficient of the error term ($Eccog_{-1}$) or the short run speed of adjustment alike the main model is significant. There is evidence that the speed of adjustment is about 0.53 implying error correction representations.

Table 5.6..estimated error correction model for imports of Consumption Goods

Dependent Variable: DLCOG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.048328	0.112650	-0.429006	0.6705
DLIFXR(-1)	0.068383	0.128700	0.531339	0.5984
DLIFXR(-2)	0.155682	0.123741	1.258126	0.2164
DLTCE	0.892571	1.196017	0.746286	0.4603
DLRER(-1)	-0.001619	0.008130	-0.199088	0.8433
ECCOG(-1)	-0.529850	0.168258	-3.149029	0.0033
R-squared	0.731249			
Adjusted R-squared	0.724200			
Durbin-Watson stat	1.871277			

Where, **DLCOG** = First difference of imports of consumption goods, **DLIFXR** = first difference of international foreign exchange reserves, **DLTCE** = first difference of Total Consumption Expenditure, **DLRER** = first difference of the real exchange rate. **ECRM** = error correction term, and the numbers in bracket denote the lag length

Capital Goods: - Regression of imports of capital goods on gross investment, lagged level of foreign exchange reserves (DLIFXR), the real exchange rate (DRER) and the error correction term (ECCAG) have given the results reported on table 5.9. All have the expected sign. There is evidence that the level of foreign exchange reserves (DLIFXR) significantly explain imports of capital goods in the short run. The error correction term also have significant coefficient indicating error correction adjustment. The real exchange rate and gross investment has the expected sign but there is no sufficient evidence they have significant influence on the short-term demand behavior imports of capital goods.

The implication of the significance of the coefficient of international reserves is that monetary authorities give licenses for import of capital goods whenever there is reliable level of international reserves due the excess demand foreign exchange.

Table 5.7.estimated error correction model for imports of Capital goods

Dependent Variable: DLCAG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.010120	0.066860	-0.151360	0.8805
DLRER	-0.008166	0.010496	-0.777974	0.4415
DLIFXR(-1)	0.343986	0.137026	2.510374	0.0166
DLINV	0.485206	0.365729	1.326681	0.1927
ECCAG(-1)	-0.374278	0.156832	-2.386487	0.0222
R-squared	0.643129			
Adjusted R-squared	0.622116			
Durbin-Watson stat	1.855081			

Where, **DLCAG** = First difference of imports of capiatl goods, **DLIFXR** = first difference of international foreign exchange reserves, **DLINV** = first difference of Total Investment Expenditure, **DLRER** = first difference of the real exchange rate. **ECCAG** = error correction term, and the numbers in bracket denote the lag length

Raw materials and Semi-finished Products: - Regression of the first difference of imports of raw materials and semi finished products on GDP of the industrial sector, and lagged level of foreign exchange reserves is given in table 5.10. All are insignificant except the error correction term ($Ecrm_{t-1}$). The feed back mechanism is magnified indicating an evidence of dominant adjustment measures pursued by economic agents.

Table 5.8.estimated error correction model for imports of raw materials and semi finished products

Dependent Variable: DLRM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.030649	0.110945	-0.276254	0.7840
DLRM(-1)	0.120728	0.189277	0.637839	0.5277
DLIFXR(-2)	0.118476	0.203761	0.581443	0.5647
DLRGDPIS	0.375645	1.592147	0.235936	0.8149
DLRER	-0.001931	0.017508	-0.110293	0.9128
DLRER(-1)	0.007409	0.012242	0.605242	0.5489
ECRM(-1)	-1.075239	0.277645	-3.872712	0.0005
R-squared	0.479890			
Adjusted R-squared	0.390728			
Durbin-Watson stat	2.183067			

Where, **DLRM** = First difference of imports of raw materials and semi-finished products , **DLIFXR** = first difference of international foreign exchange reserves, **DLRGDPIS** = first difference of Real GDP of the Industrial Sector, **DLRER** = first difference of the real exchange rate. **ECRM** = error correction term, and the numbers in bracket denote the lag length

To summarize, from the three categories of imports, import of capital goods responded for changes in international reserves. One reason could be that capital goods need more than one third of (37Percent) foreign exchange, hence its response to changes in international reserves become magnified. The other reason could be that monetary authorities give import licenses after essential

consumption and intermediate inputs (raw materials and semi finished products), which are necessary to maintain the existing consumption and production level, are satisfied. Due to its less indivisibility capital goods are allowed when there is reliable level of foreign exchange reserves after the other essential imports are maintained.

6. SUMMARY AND CONCLUSION

6.1 Summary of the Results

The purpose of this study was to characterize the behavior of demand and determinants of imports in Ethiopia. The study has used error correction model and cointegration as well as descriptive analysis. First the external sector in general imports, exports and trade policy in particular were assessed. In this assessment the structure of imports and exports, the trade balance and trade policies are analyzed. Secondly, dynamics of determinants of imports are examined using error correction and cointegration analysis.

The Ethiopian external sector can be characterized by large and fast growing trade deficit. Exports as percent of imports are declining over time. The growth in volume of exports is very low, which is about 0.37 percent in the past four decades. There is also declining growth in export earnings. On the other hand, there is magnified import surge after especially after liberalization in the early 1990s. The magnified import growth in the 1990s is in line with what was expected from the liberalization measure taken while it is opposite of what was expected from the

devaluation of the currency in 1992. One of the reasons for this surge in imports is the increased flow foreign aid and loan for investment and rehabilitation programs. The other reason is the expanded economic activity and increased investment.

Structure of imports had not been changed during the past four decades. The only component that declined is raw material imports may be due to the reason that domestic raw material substituted imports.

The country is in trade deficit almost with all of its trade partners except Djibouti and the Sudan. On the average, the country's exports finance not more than about 40 percent of the imports from major partners.

Aggregate merchandise imports as a function of international foreign exchange reserves, GDP (proxy for economic activity, the real exchange rate (proxy for relative prices) and foreign exchange receipts was used to estimate the model that specify the determinants of imports. Foreign exchange receipt was dropped from the model due to its strong exogenity to international reserves.

Accordingly, there is evidence that the level of foreign exchange reserves best explain the short run and long run behavior of imports. The long-run elasticity of imports with respect to international reserves is about 0.22 whereas those of real exchange rate and real GDP are 0.44 and 0.87 respectively. This shows the inelastic nature of imports.

The variables as they appear at levels were estimated with dummy variable for trade policy change. The dummy variable for changes in trade policy assuming no slope change has significant coefficient. This implies that trade policy regime changes during the referred periods has significant impact. This is consistent with chow breakpoint test, which suggested structural breakpoint starting in 1993.

The short run elasticity of imports with respect to international foreign exchange reserves is estimated to be about 0.15, which is less than the estimated long run elasticity. This result is close Moran's (1988) estimation (which is 0.1). This confirms Hemphill's (1974) conclusion that in foreign exchange constrained economies relative prices (here proxied by Real Exchange Rate) and economic activity (proxied by real GDP) do not robustly influence the level of imports while the foreign exchange reserves do.

The coefficient of the error term (speed of adjustment) in this error correction model is found to be statistically significant. It shows the speed at which aggregate imports adjust to foreign exchange availability in the long run. That is imports respond to the deviations from long run equilibrium.

The first hypothesis that the real level and dynamics of international foreign exchange reserves positively and significantly influence levels of Ethiopian aggregate merchandise imports in the short run is found to consistently hold true. The real exchange rate and economic activity (real GDP) although with expected sign had been

found to influence levels of aggregate merchandise imports in the short run insignificantly.

The second hypothesis that liberalization of the Ethiopian external sector especially trade policy reforms have significant impact on aggregate import performances found to hold. The significant coefficient of the dummy variable, the plot of the series and chow break point test indicate liberalization has significant influence on the level of imports

The hypothesis that categories of imports (Capital goods, consumption goods, and raw material and semi finished products) have the similar determinants is found to be true only for foreign exchange reserves.

6.2 Conclusion

In the short run, one of the most important determinants of aggregate merchandise imports in Ethiopia is foreign exchange availability in the form of international foreign exchange reserves. Economic activity (real GDP), the relative prices (in this study the real exchange rate) have no significant influence in the short run. All together with international reserves have significant influence in the long run. The other important determinant of imports both in the short and long run is trade policy regime. Openness of the economy had given rise to magnified and accelerated growth in imports.

6.3 Implications

1) The need for measures that promote exports: to increase the volume and diversify in order to fill the fast growing trade deficit.
2) The need for bilateral trade negotiations: possibility to help exports penetrate into partner markets and resist international competition.
3) This study have revealed that in the past four decades the two important determinants of trade are trade policy regime and level of international foreign exchange reserves. However, there are indications that after liberalization in the 1990s the other determinants: economic activity, foreign exchange receipts and relative prices may be important. Hence, there is a need to have separate model that take years after 1992. This could have been done by this study if there were monthly and quarterly data that made possible to elongate the sample period.
4) The need to gather reliable time series monthly and quarterly data that help to model bilateral as well as regional trade flows

7. REFERENCES

Abay. Asfaw and Zewdu Belete. (1988) Export Instability and Export Structure: The Case of Ethiopia. in The Proceedings of the 8 th Annual Conference of the Ethiopian Economy, Oct. 30-Nov. 1, pp.271-82.

Alemayehu G. (2002). Finance and Trade In Africa: Macroeconomic Response in the World Economy Context. Palgrave Macmillan, Institute of Social Studies

Alemayehu G. (1998). "Profile of Ethiopian's External Trade". The Proceedings of the 8th Annual Conference of the Ethiopian Economy, Oct. 30-Nov. 1, pp.271-82

Agnore, P.R. And Montiel, P.J.(1996).Development Macroeconomics. New Jersey, First Edition, Princeton University Press.

Bhagwati N. Jagdish. (1990). Export-Promoting trade strategy: issues and evidence. Harvester Weat sheeaf, New York. London. Toronto. Sydney.

Bharat-Ram Vinay. (1982). Towards a Theory of Import Substitution Exchange Rates and Economic Development. Delhi Oxford University Press, Bombay.

Befekadu Degefe and Berhanu Nega (1999/00). "Annual Report on the Ethiopian Economy" The Ethiopian Economy Association Vol. I.

Bo Sodersten and Geoffrey. (1994). International Economics. 3rd Edition, Macmillan Press Ltd.

Bowen P. Harry,et al. Applied International Trade Analysis. Macmillan Business, 1998

Deardorff V. Alan and Robert M.Stern. (1986). The Michigan Model of World Production and Trade: Theory and Applications. The MIT Press, Cambridge, Massachusetts, London, England,

Dollar, David. (1992). Outward oriented Economies Really Do Grow More Rapidly: Evidence from 95 LDCs. in Economic

Development and Cultural change 40, pp. 523-44. April.

Egwaikhide O. Festus. (1999). Determinants of imports in Nigeria: A Dynamic Specification. AERC, Nairobi.

Enders Walter. (1995). Applied Econometric Time Series. Lowa State University, John Willey & Sons, Inc., New York, Chichester, Brisbane, Toronto, Singapore,

FitzGerald E.V.K. The Theory of Import Substitution. Development Studies Working Papers. University of Oxford, International Development Center, May.

Frey Brunos S. and Hannelore Weck-Hennemann. (1996). The Political economy of Protection: Current Issues in International Trade. 2nd Edition, Macmillan Press Ltd, London.

Giancarlo Gandolfo. (1994). International Economics: Pure Theory of International Trade. 2nd Edition, Springer Verlag Berlin Heidelberg New York.

Greenway. David, L. Alan Wintress. (1995). Surveys in International Trade. Blackwell, Oxford UK and Cambridge UK.

Greenway. David. (1996). Current Issues in International Trade. 2nd edition, Macmillan Press Ltd.

Johnston. Jack, John DiNardo. (1997). Econometric Methods. fourth Edition, The Macgraw-Hill Companies, inc., New York.

Haile. Kibret, (1994). "Is Ethiopian Birr Over Valued". A Preliminary Assessment and Policy Implications. In The Ethiopian Economy: Problems of Adjustment. The Proceedings of the Second Annual Conference on the Ethiopian Economy, Addis Ababa.

Hemphill,Willium L.(1974)," The Effect of Foreign Exchange receipts on Imports of Less Developed Countries". IMF Staff Papers,Vol.21. PP.637-677.

Intriligator D. Michael. (1996). Econometric Models, Techniques and Applications. 2nd Edition, Prentice Hall.

MEDaCc, (1999), Survey of the Ethiopian Economy: Review of Post-Reform Developments. (1992/93-1997/98), Addis Ababa.

Moran. Cristan. (1988). Imports Under Foreign Exchange Constraint. World Bank Working Papers, WPS1.

M.P. Homi J.K. and Hisanobus. (1987). "Foreign Borrowing and Macro Economic Adjustment to External Shocks". Journal of development Economics, 26(1).

---------. World Development Report. (1985). World Bank, Oxford University Press.

Milner Chris. (1990). Export-Promoting trade Strategy: Issues and evidence. Harvester Weat Sheeaf, New York. London. Toronto. Sydney.

-------- National Bank of Ethiopia. Quarterly Bulletin of Various Years:

Morton Kathn and Peter Tulloch. (1977). Trade and Developing Countries. Croom Helm, London in Association with Overseas Development Institute,

Paulos Gutema. (1998). "Export Earnings Instability and Economic Growth in Sub-Sahara African Countries". Ethiopian Journal of Economics, Vol. II, No. 1, pp. 58-75, April.

Peter B. Kenen. (1996). The International Economy. 3rd Edition, Cambridge University Press.

Piana.Valentino.(1998).Imports.httm.www.economicwebinstitute.org/glossary/imports.htm

Rattso. Jorn, (1994). Medium-run adjustment under import compression: Macroeconomic analysis relevant for-Sub-Saharan Africa. Journal of Development economics, Vol. 45, no.1, pp.35-54.

Salvatore. Dominick, (1998). International Economics. 6th Edition, Prentice Hall International Inc.

Sekkat Khalid and Aristmene Vourdakis. Exchange Rate Management and Manufactured Exports in Sub-Sahara

Africa. OECD Development Center, Technical paper No. 134, March, 1998,

Solomon Kidane (2000). The Structure and Behavior of Import Demand in Ethiopia. unpublished, Msc. Thesis, Addis Ababa University.

Sewasew Paulos. (2004). The Relationship Between Import and GDP Growth: An Empirical Analysis, Unpublished

Teressa. Aduyna, (1997). Impacts of Foreign Aid and Trade in Ethiopia: Macro, Sectoral and Micro Level Analysis. Verlag Ulrich E. Grauer, Stuttgart.

Tura Kebede (2001). Determinants of International trade Flows: The Case of Ethiopian. Msc. Thesis, Addis Ababa University.

Woodland.A.D. (1982). International Trade and Resource Allocation. North-Holland publishing Company, Amsterdam. New York. Oxford.

World Bank (2001). Global economic prospects and the developing countries. WB Washington,

------- (1985). World Development Report. World Bank, Oxford University Press, New York and London

------ (October, 1995). World Economic Outlook. IMF, Washington DC.

ANNEXES

Annex 3.1

Percentage Contributions of Values of Components of Ethiopian Merchandise Exports (1962-2003)

Item/years	1962-1971	1972-1981	1982-1991	1992-2003	Average
Coffee	52.85	54.71	61.58	53.25	55.33
Oil Seeds	11.66	7.35	1.69	5.38	6.47
Hides and Skins	11.33	10.95	13.43	12.01	11.94
Pulses	7.52	8.06	2.36	2.67	5.03
Meat & Meat products	1.33	1.53	0.51	0.41	0.92
Fruits and vegetables	1.49	1.26	1.02	1.65	1.37
Sugar	0.32	1.53	1.7	0.54	1.00
Oil Cakes	0.91	1.25	0.41	0.39	0.72
Live animals	0.58	1.67	2.07	0.23	1.09
Chat	0.65	1.27	2.63	7.59	3.25
Gold	0.00	0.00	2.09	7.60	2.67
Petroleum products	0.00	0.00	2.52	1.87	1.13
Bees Wax	0.35	0.48	0.24	0.22	0.32
Others	9.61	8.77	7.68	6.16	7.96
Re-exports	1.41	1.17	0.07	0.00	0.63
Total	100.00	100.00	100.00	100.00	100.00

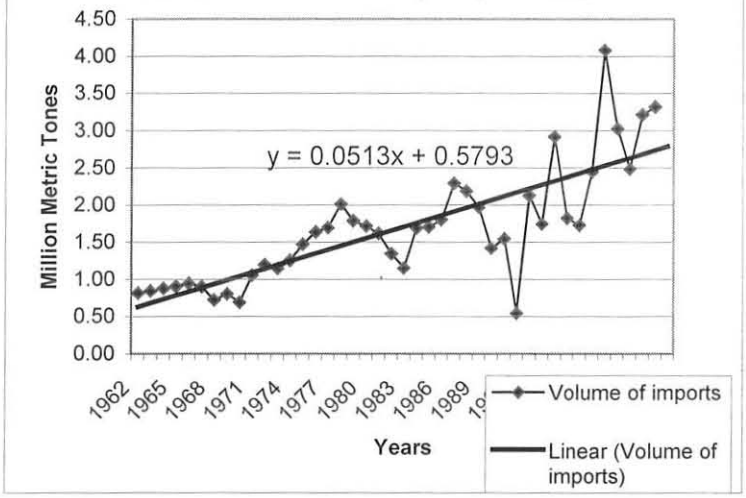
Source: - Own Computation Based on Data From Customs Authority

Annex 3.2 Percentage Contribution of Commodities for Agregate Merchandise Export Earnings (1962-2003)

Years	Coffee	Oil Seeds	Hides & Skins	Pulses	Meat & meat Prdts.	Fruit and Vegt.	Sugar	Oil Cakes	Live Animals	Chat	Gold	Petrol. Prdts.	Bees Wax	Others	R-exports	Tota of Merch Expo
1962	57.57	12.71	13.30	8.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.88	0.00	
1963	50.55	14.49	10.69	6.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.86	0.00	
1964	61.33	11.63	8.47	4.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.70	0.00	
1965	16.55	25.58	20.82	12.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.77	0.00	
1966	56.23	7.85	12.84	7.65	2.64	2.77	0.00	1.74	0.81	0.78	0.00	0.00	0.48	3.17	3.03	
1967	55.22	8.99	11.81	7.79	2.35	3.37	0.00	1.73	1.30	1.16	0.00	0.00	0.57	4.60	1.09	
1968	57.62	8.06	9.37	8.03	2.04	2.73	0.38	1.38	1.02	1.13	0.00	0.00	0.82	4.43	3.00	
1969	58.37	7.78	9.78	7.37	1.46	2.26	0.44	1.38	1.13	1.68	0.00	0.00	0.71	5.80	1.85	
1970	59.28	9.27	8.01	5.18	1.95	1.80	1.06	1.11	0.76	0.57	0.00	0.00	0.48	6.86	3.67	
1971	55.77	10.21	8.19	7.06	2.84	1.98	1.31	1.79	0.79	1.18	0.00	0.00	0.45	7.01	1.42	
1962-1971	**52.85**	**11.66**	**11.33**	**7.52**	**1.33**	**1.49**	**0.32**	**0.91**	**0.58**	**0.65**	**0.00**	**0.00**	**0.35**	**9.61**	**1.41**	
1972	47.67	12.68	12.43	6.83	3.95	2.40	2.37	1.57	1.11	0.83	0.00	0.00	0.31	6.35	1.51	
1973	37.71	10.34	13.64	15.33	3.48	1.56	3.71	1.64	1.59	0.77	0.00	0.00	0.45	8.60	1.17	
1974	27.35	17.27	8.48	18.35	2.64	2.12	0.53	1.56	2.39	1.00	0.00	0.00	0.53	16.34	1.43	
1975	30.67	16.87	6.92	13.03	1.42	1.52	1.91	1.13	5.38	1.09	0.00	0.00	0.51	13.65	5.90	
1976	55.92	5.38	9.54	9.62	1.17	1.33	3.08	1.86	3.15	1.11	0.00	0.00	0.53	5.96	1.33	
1977	75.37	2.54	7.05	6.30	0.50	1.10	0.30	1.36	0.24	0.77	0.00	0.00	0.43	3.98	0.05	
1978	79.27	1.93	10.46	2.73	0.11	0.53	0.00	0.62	0.17	0.92	0.00	0.00	0.84	2.21	0.21	
1979	69.66	1.04	16.27	2.53	0.40	0.46	0.95	1.21	0.47	1.18	0.00	0.00	0.43	5.31	0.08	
1980	64.14	1.76	12.28	2.71	0.72	0.77	1.04	0.54	1.24	2.81	0.00	0.00	0.48	11.49	0.00	
1981	59.31	3.65	12.41	3.16	0.93	0.85	1.37	0.98	0.95	2.26	0.00	0.00	0.32	13.79	0.02	
1972-1981	**54.71**	**7.35**	**10.95**	**8.06**	**1.53**	**1.26**	**1.53**	**1.25**	**1.67**	**1.27**	**0.00**	**0.00**	**0.48**	**8.77**	**1.17**	
1982	61.34	2.97	9.78	4.39	0.56	0.57	1.15	0.70	1.37	3.94	0.00	0.00	0.21	12.98	0.03	
1983	62.56	2.83	10.01	2.88	1.15	0.54	1.03	1.06	2.10	3.46	0.00	0.00	0.36	11.99	0.03	
1984	63.19	2.20	11.15	1.92	0.63	0.88	1.26	1.45	1.96	3.71	0.00	0.00	0.59	10.95	0.12	
1985	62.44	1.34	14.94	1.09	0.63	1.01	1.27	0.28	2.90	0.60	0.00	4.71	0.24	8.48	0.07	
1986	77.05	0.66	11.01	0.95	0.26	0.55	0.98	0.04	1.54	1.56	0.00	2.35	0.10	2.95	0.00	
1987	64.75	1.21	13.37	1.05	0.66	1.59	1.56	0.21	1.93	3.55	1.85	3.37	0.09	4.81	0.00	
1988	55.74	2.79	16.88	2.04	0.66	1.46	1.65	0.13	4.03	2.23	1.83	4.58	0.30	5.67	0.00	
1989	68.25	1.20	13.45	1.78	0.23	0.98	1.09	0.10	2.56	0.91	1.63	2.03	0.16	5.65	0.00	
1990	53.57	1.11	17.61	4.70	0.15	0.54	4.18	0.06	1.40	2.78	2.65	3.47	0.23	7.54	0.00	
1991	46.92	0.63	16.12	2.75	0.18	2.10	2.86	0.01	0.90	3.57	12.91	4.74	0.12	5.78	0.42	
1982-1991	**61.58**	**1.69**	**13.43**	**2.35**	**0.51**	**1.02**	**1.70**	**0.41**	**2.07**	**2.63**	**2.09**	**2.52**	**0.24**	**7.68**	**0.07**	
1992	52.87	0.12	18.42	0.12	0.01	2.01	0.55	0.00	0.15	1.59	12.36	5.91	0.21	5.68	0.00	
1993	56.57	0.12	14.17	0.43	0.04	0.29	0.54	0.00	0.14	6.92	15.63	3.19	0.20	1.74	0.00	
1994	54.31	3.34	15.40	2.10	0.05	0.52	1.95	0.00	0.81	0.83	13.65	5.48	0.42	1.13	0.02	
1995	63.46	1.77	13.18	3.64	0.21	0.65	0.08	0.00	0.27	6.08	3.64	3.35	0.23	3.44	0.00	
1996	57.76	14.05	10.38	2.59	0.41	0.70	0.00	0.00	0.03	5.84	2.28	2.08	0.27	3.61	0.00	
1997	59.29	1.90	9.57	1.98	0.62	1.18	0.12	0.00	0.29	5.60	10.69	2.13	0.24	6.39	0.00	
1998	65.30	7.11	7.86	2.33	0.66	7.11	0.00	0.00	0.24	6.16	0.00	0.23	0.24	2.76	0.00	
1999	58.08	7.46	6.68	2.79	0.87	1.12	0.03	0.00	0.16	12.23	4.79	0.00	0.27	5.50	0.00	
2000	53.91	6.45	7.24	2.02	0.83	1.12	0.61	0.00	0.36	15.63	6.57	0.00	0.14	5.13	0.00	
2001	39.49	6.97	16.76	1.86	0.38	1.20	1.86	0.00	0.06	13.86	6.38	0.00	0.20	10.98	0.00	
2002	38.48	7.93	13.51	8.04	0.26	1.88	0.00	2.43	0.19	5.53	7.90	0.00	0.17	13.68	0.00	
2003	39.46	7.33	11.37	4.19	0.55	1.98	0.79	2.23	0.11	10.77	7.30	0.00	0.11	13.81	0.00	
1992-2003	**53.25**	**5.38**	**12.04**	**2.67**	**0.41**	**1.65**	**0.54**	**0.39**	**0.23**	**7.59**	**7.60**	**1.87**	**0.22**	**6.16**	**0.00**	
Average	**55.48**	**6.47**	**11.94**	**5.03**	**0.92**	**1.37**	**1.00**	**0.72**	**1.09**	**3.25**	**2.67**	**1.13**	**0.32**	**7.96**	**0.63**	

Annex 3.3.

Trends in the Volume of Imports (1962-2003)



Annex 3.4

Ethiopia's Direction of Foreign Trade 1975-2003 with Major Trade Partners in Percent From Total

Country	Item	Years					Average
		1975-1980	1981-1986	1987-1992	19193-1997	1998-2003	
Djibouti	Exports	6.37	6.26	5.84	7.40	10.92	7.00
	Imports	0.23	0.40	2.24	3.44	2.41	1.60
Kenya	Exports	0.00	0.01	0.23	0.36	0.25	0.15
	Imports	0.00	0.15	1.92	2.74	1.20	1.10
Sudan	Exports	0.00	0.08	0.08	0.45	0.06	0.12
	Imports	0.00	0.01	0.01	0.10	0.05	0.03
U.A.R	Exports	2.75	0.65	0.00	0.35	0.72	0.90
	Imports	0.03	0.10	0.19	1.19	2.78	0.80
France	Exports	3.01	4.74	3.96	3.32	3.12	3.53
	Imports	3.03	2.80	2.24	1.94	2.63	2.46
Germany	Exports	12.92	13.82	19.29	21.11	15.11	15.73
	Imports	11.72	11.58	11.16	9.11	5.79	9.70
Italy	Exports	6.62	9.04	19.29	21.11	15.11	13.43
	Imports	12.18	11.90	15.00	10.18	7.97	11.21
Netherlands	Exports	3.57	3.43	3.14	1.45	1.44	2.60
	Imports	2.58	2.30	3.41	4.21	2.05	2.80
U.K.	Exports	2.68	1.69	4.06	3.11	2.70	2.75
	Imports	7.50	7.28	7.85	4.97	4.28	6.28
Russia	Exports	1.71	2.38	4.76	0.01	0.02	1.84
	Imports	1.29	20.33	9.60	0.16	0.50	6.58
Yugoslavia	Exports	0.75	0.05	0.11	0.05	0.00	0.20
	Imports	0.73	1.53	0.90	0.03	0.05	0.67
U.S.A.	Exports	26.00	15.62	9.65	6.83	4.51	12.56
	Imports	8.66	8.39	11.17	8.92	5.85	8.34
China, P.Rep.	Exports	2.96	1.68	0.10	0.03	0.76	1.12
	Imports	1.94	0.71	0.63	2.06	5.88	2.00
Japan	Exports	7.17	5.87	13.51	11.82	9.94	9.24
	Imports	14.02	8.23	7.95	6.22	5.36	8.23
Saudi Arabia	Exports	9.61	5.40	7.23	6.77	7.71	7.10
	Imports	7.24	1.30	3.76	13.98	8.07	6.43
Rest of the World	Exports	13.86	12.59	8.77	15.83	27.64	14.85
	Imports	28.86	23.01	21.96	30.78	45.12	28.38
Total	Exports	100.00	100.00	100.00	100.00	100.00	100.00
	Imports	100.00	100.00	100.00	100.00	100.00	100.00

Source: - Own Computation Based on Data From National Bank of Ethiopia

Annex 5.1

The Results the Test for Stationarity (order of integration)

	ADF Test Statistics	Critical values		
Variable	Calculated	at 1%	at 5%	at 10%
LVOM	1.038	3.5889	2.9303	2.06030
D(LVOM)	6.1107	3.5930	2.9320	2.6390
LIFXR	1.4675	3.5930	2.9320	2.6039
D(LIFXR)	3.9739	3.5973	2.9339	2.6048
LFXE	0.5315	3.5889	2.9303	2.6030
D(LFXE)	5.8015	3.5930	2.9320	2.6039
LRGDP	0.2826	3.5889	2.9303	2.6030
D(LRGDP)	6.9156	3.5930	2.9320	2.6039
LRER	0.9130	3.5889	2.9303	2.6030
D(LRER)	5.2373	3.5930	2.9320	2.6039

Note: LRGDP = Ln of real GDP, LVOM= Ln of Volume of imports, LRER = Ln of Real Exchange Rate, LFXE= Ln of Foreign Exchange Earnings, IFXR = Ln of International Foreign Exchange and D stands for first difference

Annex 5.2:

Pair wise Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Probability
DLRER does not Granger Cause DLVOM	32	2.05737	0.17266
DLVOM does not Granger Cause DLRER		0.90652	0.58021
DLRGDP does not Granger Cause DLVOM	32	1.69698	0.24677
DLVOM does not Granger Cause DLRGDP		0.32902	0.95615
DLFXE does not Granger Cause DLVOM	32	0.29574	0.96892
DLVOM does not Granger Cause DLFXE		2.06647	0.17117
LDIFXR(-1) does not Granger Cause DLVOM	32	1.07972	0.47975
DLVOM does not Granger Cause DLIFXR(-1)		1.83229	0.21513
DLRGDP does not Granger Cause DLRER	32	1.76127	0.23109
DLRER does not Granger Cause DLRGDP		3.03137	0.07461
DLFXE does not Granger Cause DLRER	32	0.47551	0.87677
DLRER does not Granger Cause DLFXE		0.48279	0.87209
DLIFXR(-1) does not Granger Cause DLRER	32	10.7238	0.00217
DLRER does not Granger Cause DLIFXR(-1)		0.32697	0.95700
DLFXE does not Granger Cause DLRGDP	32	0.43038	0.90456
DLRGDP does not Granger Cause DLFXE		0.57668	0.80811
DLIFXR(-1) does not Granger Cause DLRGDP	32	2.36773	0.12965
DLRGDP does not Granger Cause DLIFXR(-1)		2.53228	0.11223
DLIFXR(-1) does not Granger Cause DLFXE	32	3.03237	0.07455
DLFXE does not Granger Cause DLIFXR(-1)		0.96457	0.54463

Where: LRGDP = Ln of real GDP, LVOM= Ln of Volume of imports, LRER = Ln of Real Exchange Rate, LFXE= Ln of Foreign Exchange Earnings, IFXR = Ln of International Foreign Exchange

Annex 5.3:

Estimated eigenvalues, and Log likelihood ratio For Aggregate Imports

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.659581	84.55523	39.89	45.58	None **
0.569630	43.60725	24.31	29.75	At most 1 **
0.212139	11.56905	12.53	16.31	At most 2
0.063884	2.508594	3.84	6.51	At most 3

Series: LVOM LIFXR(-1) LRER LRGDP; Lags interval: 1 to 5;
*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 2 cointegrating equation(s) at 5% significance level

Annex_5.4

Estimated long run elasticity of import demand for aggregate imports
Dependent Variable = LVOM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.387627	1.106223	-0.350406	0.7279
LIFXR(-1)	0.145896	0.042788	3.409763	0.0015
LRER	-0.235751	0.170640	-1.381571	0.1750
LRGDP	0.863282	0.138551	6.230808	0.0000
DUMY	-0.164319	0.078654	-2.089149	0.0433
R-squared	0.859868	Mean dependent var		7.352295
Adjusted R-squared	0.845495	S.D. dependent var		0.460530
S.E. of regression	0.181021	Akaike info criterion		-0.473762
Sum squared resid	1.277976	Schwarz criterion		-0.271013
Log likelihood	15.42277	F-statistic		59.82715
Durbin-Watson stat	1.669629	Prob(F-statistic)		0.000000

Where: LVOM= Ln of Volume of imports, LRGDP = Ln of real GDP, LRER = Ln of Real Exchange Rate, IFXR = Ln of International Foreign Exchange Reserves and Dumy= Dummy variable for trade policy regime

Annex 5.5

Estimated eigenvalues, and Log likelihood ratio for consumption goods

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.629122	64.92452	47.21	54.46	None **
0.458253	27.23299	29.68	35.65	At most 1
0.088639	3.940654	15.41	20.04	At most 2
0.010827	0.413656	3.76	6.65	At most 3

Series: LCOG LRER LIFXR(-1) LTCE
*(**) Denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 1 cointegrating equation(s) at 5% significance level
Normalized Cointegrating Coefficients: 1 Cointegrating Equation(s)

Annex 5.6

Estimated eigenvalues, and Log likelihood ratio for capital goods

	Likelihood	5 Percent	1 Percent	Hypothesized

Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
0.797889	135.6694	53.12	60.16	None **
0.678895	74.90983	34.91	41.07	At most 1 **
0.473529	31.74227	19.96	24.60	At most 2 **
0.176148	7.363061	9.24	12.97	At most 3

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 3 cointegrating equation(s) at 5% significance level
Normalized Cointegrating Coefficients: 1 Cointegrating Equation(s)

Annex 5.7

Estimated eigenvalues, and Log likelihood ratio for raw material and semi finished products

Eigenvalues	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.854648	113.3588	53.12	60.16	None **
0.450555	40.07211	34.91	41.07	At most 1 *
0.292107	17.31597	19.96	24.60	At most 2
0.104364	4.188415	9.24	12.97	At most 3

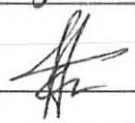
*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 2 cointegrating equation(s) at 5% significance level

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all source of materials used for the thesis have been duly acknowledged.

Declared by:

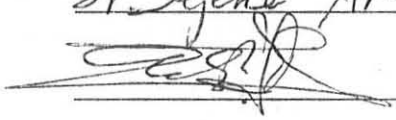
Name: Dejene Leggesse

Signature: 

Date: June 13, 2005

Confirmed by Advisor:

Name: Dr. Dejene Aredo

Signature: 

Date: June 13 2005

Place and date of submission: Addis Ababa, June 2005.