DETERMINANTS OF INTERNATIONAL TRADE FLOWS: THE CASE OF ETHIOPIA

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ABSTRACT

This paper utilizes an error correction model to identify the determinants of international trade flows of Ethiopia through the estimation of demand elasticities for aggregate imports and exports and their respective components during 1974/75:1 – 1999/2000:4. In the estimation of the long run relationships among the variables, the Johansen multivariate cointegration procedure is employed. Accordingly, the results show that the country faces inelastic short-run price elasticities for aggregate import and its components (fuel and machinery). Similarly, the real income elasticities are lower for aggregate imports but though larger for fuel and machinery they are found to be weakly significant for machinery (significant only at 10 percent). On the other hand, foreign exchange receipts are found to affect imports more significantly. The lagged imports have, however, an indirect relationship with the current import demand. The inelastic price elasticities of demand for imports imply that price policies such as devaluation have less impact to reduce the volume of imports. Furthermore, the lower real income elasticity for aggregate import together with its being weakly significant for components imports implies that stabilization policies are less powerful in assisting trade liberalization efforts. More generally, policies that affect the foreign exchange availability in the form of capital inflow and export earnings are likely to have a larger impact on import volumes than those that depend exclusively on exchange rate and aggregate demand management.

The results of the estimation of aggregate export and its components (coffee and hides and skins) also indicate that the price and income elasticities that the exports of the country's primary commodities face in the international markets are relatively smaller. Furthermore, the lagged exports for both coffee and hides and skins have negative relationships with the current export demand. The inelastic price and income elasticities for export demand imply that there is a need for further diversification of exports that helps to shift towards the export of manufactured goods. The negative relationship of lagged exports with the current export demand also implies that the country has to diversify the destination of its exports.

CHAPTER ONE: INTRODUCTION

1.1 Background

Issues related to the factors that determine the flow of trade among countries is central to international trade analysis. Classical economists attributed it to the difference in labour productivity (Salvatore, 1993). Recently the difference in the endowments of factors of production was mentioned as the causes for trade (see in Sodersteen and Reed, 1994). The most recent studies have explained trade flows in terms of increasing returns and imperfect competition- the intra-industry trade case (Krugman, 1990).

Since 1950's, however, the benefits from international trade have been questionable due to a structural tendency for the "net barter terms of trade" of developing countries to deteriorate in their dealings with the industrial countries (the Prebish-Singer hypothesis). This argument became the basis for the idea of inward-oriented trade strategy in which countries adopted import quotas, high tariffs and other restrictive measures to discourage imports. With the current widespread trade liberalization, however, most countries have opened up their trade regime and reduced these trade restrictions.

Recently Ethiopia has also jointed the block of trade liberalizing countries. During the Imperial regime, the country's trade policy had been characterized relatively by the absence of quantitative and exchange restrictions. The policies focused on quality control of imports and exports and the import of capital and raw materials was encouraged. Export promotion

policies were also adopted. Consequently, the performance of exports was in a better position in contrast with the African standards during that period and, particularly, export revenue covered the import requirements of the country (Gebeyehu, 1983)

However, as the country moved towards central planning, the free trade policy was abandoned in mid 1970's. The country's foreign trade regime was then turned into more restrictive policy. The government was pursuing the strategy of import substitution, thus, adopting strict import licensing, tariff and quantitative restrictions. The discriminatory allocation of foreign exchange and other policies such as the licensing procedure were against the private sector participation in foreign trade.

Trade reform policies have been undertaken aiming at export promotion and a more open trade regime since 1992. Consequently, the previous restrictive trade policies have been relaxed. Various measures have been taken since October 1992, subsequent to the initial measure of devaluation of the national currency. The measures, overall, aim at encouraging exports and reducing imports.

1.2 Statement of the Problem

Less developed countries (LDCs) are often exposed to external shocks. For instance, many LDCs were hit by the widespread balance of payments crisis of the 1980s, which in turn resulted in a serious debt problem. This situation increased their need for higher export receipts. Furthermore, the influence of international creditors, particularly that of the

international financial institutions, i.e., International Monetary Fund (IMF) and the World Bank on policy making of LDCs has been tantamount. These institutions are known to provide loans and/or assistance with strict conditionalities, some of which are related to trade policy.

The main cause for the exposure of LDCs to external shocks is their dependence on primary commodities for exports the real prices of which have depicted a downward trend since 1980s. Export earnings of these countries are not significant. The Asian countries are the exceptions in this regard. The following remark endorses the foregoing notion:

> *The Asian experience is characterized by a marked shift toward the export of manufacturers and strong increase in real export earnings; at the extreme Africa can be generally described as a situation in which continued reliance on primary commodity exports has resulted in a marked and persistent deterioration in real export earnings (Reinhart and Wickham, 1994).*

The situation in Ethiopia is not different from that of other LDCs. The country, apart from being the poorest nation in the world, is highly exposed to external shocks. The main reason for such exposure is its heavy reliance on the export of agricultural products on the one hand, and the import of basic goods, on the other. Looking at the export sector, coffee is a single largest commodity not only in terms of its share in total export volume but also in terms of its foreign exchange earning capacity. It alone accounted for about 58.7 percent, 61.6 percent and 60.8 percent of total exports in 1970/71, 1980/81 and 1997/98, respectively. Similarly, of the total USD 347:7 million average export receipts earned during 1970/71-1999/2000, USD 209.8 million was generated from coffee export. This actually explains the weakness of the

non-coffee export sector. Basically, there has been no decline in the dependency level on primary commodities as the main source of export. In other words, there is no shift towards the export of semi-processed and manufactured goods. Consequently, the export earnings generated from the export of primary commodities is very low, and unable to cover the import needs of the country. The country sometimes faces uncertainty about its export earnings. For instance, whenever there is good coffee harvest in Brazil, given global demand for coffee, international coffee price tends to go down and the receipts of Ethiopia from the export of coffee decline.

From the import side, its imports constitute such essential commodities as capital goods, intermediate goods and consumer goods, which are crucial for production as well as consumption purposes. These goods have to be imported at world prices since they are not sufficiently available domestically. As a result, the value of imports has been increasing over time. But the value (quantity) of imports should have declined as a result of devaluation. However, even adjusting for price, the value of import is not declining after the reform. The devaluation-adjusted value of imports was USD 722.3 million in 1992/93 and rose to USD 1219.7 million in 1995/96 and USD 1357.3 million in 1997/98[1]. After showing a subsequent rise, imports registered USD 1614.3 million in 1999/2000. Similarly, the average growth rate of imports was about 3.4 percent from 19981/82-1991/92 but 8.9 percent during 1992/93-1999/2000. Such fast growth in imports combined with sluggish growth in exports resulted in persistent trade deficit. The deficit has been expanding over time. It was 68% of exports

[1] These figures and others in this section are computed from the NBE Quarterly Bulletins and Annual Reports of various issues

between 1963-1965 but surged to 293.6% between 1989/90 and 1991/92 and stood at 215.3% and 145.8% during 1992/93-1994/95 and 1995/96-1997/98, respectively.

The uncertainty in the export sector and its limited ability to earn sufficient forex and, subsequently, the limited capacity to import basic investment goods, inter alia, has retarded the economic growth of the country.

With the country moving towards market-oriented economic system, trade reform as an integral part of the structural adjustment program has been implemented. One of the objectives of the reform program is to encourage exports (Government of Ethiopia, 1998). In this regard, such policies as devaluation of the national currency, foreign exchange auctioning, removal of taxes and duties on exports, provision of foreign exchange retention scheme for exporters, streamlining of export licensing procedure and export credit guarantee were undertaken to promote the export sector. On the import side, there is relaxation of quantitative restrictions, reduction of average tariffs rates and simplifying import-licensing procedures.

The above liberalization efforts may not bring the desired results due to the prevalence of both internal and external factors. From internal point of view, the problems in the export sector are mostly structural. The absence of diversification of exports, the lack of agricultural land to expand production of exports, the cost of transporting coffee from the coffee growing regions to auction centers and to port, and lack of better quality exports are some of the impediments to be mentioned. The lack of sufficient domestic savings and investment funds

will also hamper the effort to establish import substitution. The external factors include the lack of competitiveness in the international market and the existence of protection in some developed countries for primary commodities. According to Glover and Tussie (1993), for instance, "a number of developing countries have more open trade policies, as measured by the level and dispersion of tariffs and prevalence of quantitative restrictions, than the United States or the European Economic Community". This has a clear implication for the country's exports, as United States and European countries are the major trade partners of the country.

The problem is then the world demand particularly that of industrial countries may constrain the exports of the country due to low income and price elasticities of demand for exports. According to Mengisteab (1991), the world demand elasticity for cocoa, coffee and tea respectively are –0.30, 0.230 and –0.250. In this regard, it is crucial to know the income and price elasticities of demand for the country's exports. On the other hand, some of the policies implemented are also likely to increase the demand for imports. This, associated with the currency depreciation, may even worsen the country's external balance since it imports essential goods, which it cannot cut down. It is, therefore, necessary to know the demand for imports and the import demand elasticities. The effectiveness and credibility of trade liberalization policies even depends on the size of real income and relative price import demand elasticities (Mwega, 1993).

Previous studies conducted on this area for Ethiopia are scant. Some of them have specification problems and do not take in to account the time series characteristics of the data. For example, Muluneh (1982) in his effort to estimate import demand did not detect the

problem of spurious regression in his estimation of import demand. He did not also include all relevant variables in his model. The study by Solomon (2000) on the import demand, though used modern econometric techniques, was based on the fewer observations when viewed from the techniques used in the study. On the export side, most studies in Ethiopia have focused on the determinants of export supply (See for example World Bank 1987, 1997, Berhane 2000) than export demand. Haile (1994) estimated export demand using OLS estimation method.

The foregoing problems, thus, necessitated conducting an in-depth and comprehensive study on the determinants of the country's foreign trade viewed from the demand side, i.e., the demand for imports and exports of the country.

1.3 Objectives of the study

The main objective of this paper is to analyze the determinants of international trade flows of Ethiopia. In particular, it estimates the aggregate import and export demand functions and for selected commodities using recent time series econometric techniques. In this regard, both short and long-term elasticities are estimated and conclusions based on the estimation results are made. In particular we want to test the hypotheses that:

- While real income, international reserves and foreign exchange receipts positively influence the country's demand for imports, relative price has a negative effect.

- The demand of trading partners for the country's exports is affected positively and negatively by the real income of its trading partners and the relative prices of exports, respectively.
- The country faces low income and relative price elasticities for imports and exports.

1.4 Significance of the Study

International trade can contribute a lot to the development of a country. As already mentioned Ethiopia has been implementing trade reform policies to realize the gains from foreign trade. There are few studies conducted for Ethiopia in the area of the determinants of trade from the demand side. However, import and export demand elasticities are critical for trade policy implementation. The current study incorporates large data sets and relevant variables in import and export demand functions. In this case, it will supplement the already existing empirical literature on LDCs by presenting the empirical evidence from Ethiopia. It will also make some contributions for policy makers and interested researchers by providing information concerning the determinants of international trade flows of the country seen from the demand side.

1.5 Scope of the Study

The current study covers the period between 1974/75 and 1999/2000. Quarterly data during this period (1974/75:I – 1999/2000:IV) are employed in the study. The period is chosen on the basis of the availability of reliable data.

1.6 Organization of the Study

The rest of the paper is organized as follows. Chapter two surveys the relevant theoretical and empirical literature. The third chapter provides an overview of Ethiopia's external trade. In Chapter four, the methodology used in the study including model specification and econometric techniques as well as data definitions and sources will be discussed. The estimation of the model and the analysis of the empirical results are considered in Chapter five. Finally, conclusion and policy implications are discussed in Chapter six.

CHAPTER TWO: SURVEY OF LITERATURE

There is a wide literature on the determinants of international trade flows. This ranges from theoretical framework to empirical analysis. From the theoretical side, various theories have emerged based on certain specific assumptions. The current trend is, however, to explain trade in terms of imperfect competition and increasing returns. On the other hand, most of the empirical works dealt with the impact of prices and income on the flow of trade. In this regard, the empirical investigation of the import demand and export demand functions have been one of the active research areas in the international economics.

The main focus of this chapter is to review the theoretical framework and empirical literature related to the on going study. Since we are dealing with international trade, it is also essential to discuss various theories of international trade. We also highlight the relationship between trade and economic growth, as international trade is believed to contribute to economic growth.

2.1 Theoretical Framework

International trade theory is one of the oldest sub fields of economics. It is basically the extension and application of microeconomic theories of production and exchange to the study of economic transformations between agents in various countries. Accordingly, it adopts the basic profit and utility maximization paradigms to discuss why trade takes place between countries, what goods they export and import, how trade affects resource allocation, and

whether a country benefits from international trade (Bowen, et al, 1998). Although the theory combines the elements of demand behavior with the production structure in a general equilibrium framework, variations in the specification of the production side primarily distinguishes the basic trade models (Jones and Neary, 1984). Specifically, the formal treatment of as to how countries gain from trade goes back to the works of Adam Smith and David Ricardo. Before discussing the classical trade theories, we try to touch upon the early theories of trade.

2.1.1 Early Theories of Trade

During 17th and 18th century, the dominant economic doctrine was mercantilism, which was highly nationalistic, and generally saw foreign trade with apprehension (Sodersten and Reed, 1994). The mercantilists maintained that international trade is attractive as far as it leads to a surplus in the balance of payments. Exports were viewed as favourably good since they encourage domestic industry and help to obtain precious metals, primarily gold and silver. Hence, a country that acquired more gold and silver was considered as the richer and more powerful one (Salvatore, 1993). Imports, however, were observed with suspicion as they result in the reduction of demand for domestic industry and further lead to the outflow of precious metals (bullion). The mercantilists thus advised policy makers to encourage exports and production through state support and subsidies, while imports should be discouraged through protectionist policies particularly in industries of strategic importance.

Despite such assumptions, the view of mercantilism has its own weakness. Its main problem was that "it missed the main point of what trade is all about and thereby failed to recognize that its conclusions were valid only in certain cases rather than in general" (Williamson, 1983:20). It also measured the wealth of a country by the amount of precious metals. In contrast, today, the wealth of a nation includes the human capital, man-made and natural resources of that nation. In the mercantilists doctrine one country is believed to gain from trade at the expense of another. However, it is unlikely for two nations to exchange commodities if both do not gain from trade. It was on this background that the English classical economists such as Adam Smith and David Ricardo developed the classical theory of international trade.

2.1.2 The Classical Trade Theory

Adam Smith (1776) developed the original classical trade theory in his opposition against mercantilist doctrine. The quintessence of this theory is that a given country benefits by engaging in trade since trade increases consumption vis-a-vis the country in isolation. In his view, if two countries concentrate their production on the good in which they have an absolute advantage (less labour cost) and if that good is exported to the trading partner both can consume more than in the absence of trade. Hence, unlike the case of mercantilism, he believed that both nations would gain from free trade. Apparently, he strongly advocated a policy of ***laissez-faire*** i.e., non-interference in trade and considered free trade as the best policy for trade between countries.

Smith's analysis, however, has failed to provide an explanation as to how trade takes place between nations if one country is more productive than another in all lines of production. In this regard, absolute advantage can better explain trade between developed and developing nations and fails to explain the bulk of trade that takes place between developed countries (Salvatore, 1993). Ricardo (1817), thus, developed his principle of comparative advantage on this background. The principle of comparative advantage argues that "trade between two countries of not too different size would be beneficial even if one has an absolute productive advantage (a lower price) in all goods" (Bowen, et al, 1998:77).

Based on his celebrated example of England and Portugal with both assumed to produce wine and cloth and Portugal being more efficient in the production of both goods, Ricardo illustrated the principle of comparative advantage. Unlike the case of Smith, trade would take place between the two countries even in this situation (i.e. with Portugal being more efficient in both goods) as can be observed from Ricardo's (1817:135) statement:

> .... *It would, therefore, be advantageous for her (Portugal) to export wine in exchange for cloth. This exchange might even take place, notwithstanding that the commodity imported by Portugal could be produced there with less labour than England.*

This would happen since both countries can reallocate their labour to the production of the good where they have comparative advantage, export this good and import the other (Sodersten and Reed, 1994). In this case, both countries would gain from trade as each can consume more by trading.

The principle of comparative advantage is built upon such restrictive assumptions as two countries, two commodities, single input (labour) and constant returns to scale (Bhagwati, 1963). Based on these assumptions, it explains how international trade can take place and gives a basis for predicting the pattern of trade. The Ricardian theory, therefore, considers differences in technology between countries as the basis for international trade.

One of the flaws of the Ricardian trade theory is that it does not give an explanation about the sources of comparative advantage. The implication of the theory for developing countries is that they are required to specialize in the production of primary commodities "which is one of the major problems of the South in general and Africa in particular"(Alemayehu, 1999: 272). Moreover, the theory overlooks the variability between labour productivities across countries and hence fails to provide concrete guide as to how labour productivity and comparative advantage is expected to evolve (Bowen, et al, 1998). The existence of such problems in the Ricardian theory, therefore, has led to the emergence of neoclassical trade theories.

2.1.3 The Neoclassical Trade Theories

The neoclassical trade theories, which emerged in the twentieth century, have made significant contribution to the ramification of the theory of comparative advantage and gave it a more powerful explanation. The theory was first enunciated by Heckscker (1919) and later elaborated by his student Ohlin (1933) and hence termed as the Hecksher-Ohlin (H-O) model.

The H-O model rests on a number of assumptions including: 1) two countries, two goods and two factors (capital and labour), 2) absence of transport cost and impediments to trade, 3)

perfect competition, 4) constant returns to scale, 5) different factor intensities for the two goods, 6) different technology between countries but the same in both countries, 7) perfect factor mobility between industries in the country but immobility between countries.

Based on these assumptions, the H-O model attributed comparative advantage and trade to the variability in the relative supplies of factors between countries. Accordingly, the exports of a country utilize the abundant factor that the country most endowed with (Bhagwati, 1963). In this case, the capital- abundant[2] country will export a good whose production is relatively capital- intensive, and the labour-abundant one export labour-intensive good.

One of the major problems of H-O model is that its assumptions are not consistent with reality. It is obvious that tastes and technology are not identical between countries. There are also barriers to trade in the form of transport costs, tariff and other trade policies. The model predicts that the exports of less developed countries would tend to be labour-intensive products (Vernon, 1966). Furthermore, there is no one-to-one correspondence between the physical definition and price definition of factor-abundance with strong bias for the abundant factor. However, the problem of demand bias could be overcome when preferences are assumed to identical and homothetic across countries. The model, which makes this explicit assumption, is often referred to as the Heckscher-Ohlin-Samuelson (H-O-S) model. This ensures a one-to-one correspondence between the physical and price definitions of factor abundance (Bowen et al, 1998, Sodersten and Reed, 1994)

[2] Two definitions of factor-abundance are used in the literature. A home country is said to be capital-abundant either 1) if its capital-labour ratio exceeds that of foreign country or 2) if it has lower price for capital under autarky than that of foreign country (Sodersten and Reed, 1994).

The H-O model is also empirically questionable. Bhagwati (1963:7) has pointed out that the H-O theorem invites direct testing and consequently summarized studies conducted in this area as follows:

> *And this is exactly what Leontief has done for the United States and Tatemoto and Ichimura for Japan. Both studies take 'capital' and 'labour' as the factors in terms of which 'abundance' and 'factor-intensity' are defined. They both turn up what appear to be startling results: the U.S.A emerges as importing capital-intensive imports and exporting labour- intensive ones, and Japan has labour-intensive imports and capital-intensive exports.*

Leontief's calculations used the 1947 data on U.S.A trade and the U. S.A. input-output matrix. His conclusion is often called the 'Leotief Paradox'-the paradox is that U.S.A. being capital-abundant country seemed to import capital-intensive goods but export labour-intensive commodities (see Salvatore, 1993 for the explanation of 'Leontief Paradox'). Recently, the new trade theories have emerged to give further explanations on the determinants of international trade. The next subsection will be dealt with these theories.

2.1.4 The New International Trade Theories

The orthodox theories of trade discussed earlier attributed the pattern and composition of trade to the cross-country differences in either technologies or resource endowments. They have succeeded in explaining the determinants of inter-industry trade. They, however, explained little the extent of intra-industry trade between countries with similar factor endowments (Chang and Katayama, 1995). They have also ignored increasing returns as a cause for international trade mainly due to difficulty in dealing with the implications of increasing returns for market structure (Krugman, 1979a). Currently, however, it has been widely recognized that economies of scale give an alternative to variation in factor endowments or

technology as an explanation for international trade (Krugman, 1979a: 469). Particularly, extensive effort has been made to model and explain intra-industry trade, which essentially comprises huge volume of trade between industrial countries. One such approach is to adopt the analysis of perfect monopolistic competition to the problem of intra-industry trade (see Krugman, 1979a, 1980, Lancaster, 1980). This new framework whose elements are economies of scale, product differentiation and imperfect competition is termed as new trade theory.

The new trade theories emerged in the 1970s and 1980s, disputing the orthodox assumptions of perfect competition and constant returns to scale. They instead focused on imperfect competition and increasing returns[3] that would reflect the real world. Imperfect competition could arise due to entry barriers, technological features, government regulation, patent protection, uncertainty, firms' strategic behaviors, or the existence of large fixed costs (Chang and Katayama, 1995).

However, one can find various definitions of new international trade theories. For instance, Ocampo (1986) divided these theories into three broad categories. The first is the technological- gap theories including the product-cycle hypothesis such as that of Vernon (1966). The second one is constituted by theories of product diversification and intra-industry trade, and the third being the one that is based on the traditional external economies. Krugman (1990: vii), on the other hand, defines new trade theory as "an approach to international trade that emphasizes precisely the features of the international that traditional

[3] Increasing returns to scale refers to the production situation in which output increases more proportionately than the increase in factors of production. It may arise since a greater division of labour and specialization can occur at a large scale of production (Salvatore, 1993).

trade theory leaves out: increasing returns and imperfect competitions." He further outlined the differences between traditional and new theories on the basis of basic questions of international trade: Why is there international trade? What determines the pattern of specialization? What are the effects of protection? And what is the optimal trade policy?

As far as the first question is concerned, the new theories attribute trade to the economies of scale (see also Krugman, 1979a, 1980). Accordingly, the basic assumption is that only one country may have economies of scale in the production of specific commodity and hence this must be traded in order to allow the centers of production to serve the world.

With regard to the determinant of international pattern of specialization, increasing returns is the main factor that keeps the industry in particular country. On the other hand, on the effects of protection, the new theories consider that the result of the protection could be either much lower or much better unlike the case of traditional theories. To put it differently, if all countries protect specific industry, it may lead to inefficiency in the production and failure in specialization in accordance with comparative advantage. In the optimal trade policy front, the traditional theory advocates free trade. However, the new trade theories suggest even stronger case for free trade with the possibility of using such tools as export subsidies, temporary tariffs, .etc. Since the firms' behaviour is subject to change, the optimal trade policy for new trade theories may vary from an export subsidy to the opposite case of an export tax (Chang and Katayama, 1995).

2.1.5 Trade and Economic Growth

The relationship between trade and economic growth is controversial in the literature. Two different schools of thought are prevalent in this case, one believing in "outward-orientation" and the other in "inward-orientation"[4] - the former called "export optimists" and the later "export pessimists."

The "export optimists" consider the world demand as favorable and give due emphasis to trade liberalization. They advise that the move towards outward-oriented policies is the best strategy for enhancing economic growth (Singer and Gray, 1988). This is because trade is believed to enhance growth through (1) increasing specialization and raising efficiency, (2) providing greater economies of scale due to increased market size, (3) raising capacity utilization, and (4) bringing more rapid technological change (Ram, 1987). These are the standard neoclassical arguments, which consider trade as having a positive impact on economic growth due to better allocation of resources.

Moreover, the "two-gap" model of development suggests direct role of exports on economic development due to a reduction of the foreign exchange gap (Ram, 1985). According to the models in the new trade and growth literature, trade also results in faster growth of the economy. These models are based on technology spillover and research and development (R&D) in explaining economic growth (Dodzin and Vamvakidis, 1999). However, most of

[4] According to World Bank (1987), an outward-oriented strategy is the one in which trade and industrial policies do not discriminate between production of domestic goods and foreign goods. By contrast, an inward-oriented strategy is one in which trade and industrial, incentives are biased infavour of production for the domestic over the export market.

these theories rest up on the specific situation of industrialized countries than the developing ones.

On the contrary, the "export pessimists" believe that relying on exports as an "engine of growth" will not necessarily be favourable to growth since external factors constrain the benefits from exports. This school of thought particularly argues that since developing countries face a secular decline in their terms of trade, the benefit they gain from trade is minimal. This is attributable to low income elasticity of demand for primary products, substitution of these products by synthetic products and the reduction in the amount of raw materials needed for industrial production in developed countries through technical innovations (World Bank, 1987). Consequently, export pessimists advise developing countries to adopt inward-oriented strategies (import substitution[5]) in order to avoid dependence in an uncertain world.

Import substitution strategy was predominant in the 1950s and 1960s. Actually, the oldest argument in this area is the "infant industry" argument, which argues that manufacturing industries in LDCs should be protected until it could compete at the same level with the developed ones (Findally, 1984). The argument basically postulates that some industries incur initially huge costs but in the long run they have comparative advantage after taking time to develop.

In this regard, some policy instruments should be adopted on the basis of their ability to

[5] See Eshetu (1983), for the measurement problems of import substitution.

protect domestic industries. These include various mixes of tariff, restrictions on imports, provisions for duty-free imports of capital goods, and a variety of domestic incentives (Krueger, 1984).

Even empirically, there is little consensus as to whether trade increases economic performance or not. Such authors as Krueger (1978), Ram (1985, 1987) and World Bank (1987) indicated that the economic performance of those countries that adopted an outward-oriented strategy was superior to that of inward-oriented ones. Alam (1991) also found a strong correlation between outward-orientation of trade policies and output growth rates. On the other hand, Singer and Gray (1988) found that outward-oriented strategy is not necessarily a valid policy recommendation for all conditions and all countries. Similarly, Svedberg (1991), who conducted a study on the export performance of Sub-Saharan African countries, concluded that the export performances of these countries were negatively affected due to stagnant and deteriorating barter terms of trade[6].

2.1.6 Issues Related to Import and Export Demand Equations

The modeling of the external trade has a long history. The appropriate model is, however, expected to depend on, inter alia, the type of goods being traded, on the end-use of commodity, on the institutional framework under which trade takes place, on the purpose of the modeling exercise, and on the data availability (Goldstein and Khan, 1985).

[6] See Diakosavvas and Scandizzo (1991) for evidence and controversy over the deterioration in terms of trade.

Nevertheless, two general models have been dominant in the theories of demand for tradable goods: the imperfect substitutes model and the perfect substitutes model.

The basic assumption of the imperfect substitutes model is that neither imports nor exports are perfect substitutes for domestic goods. In this case there is no possibility for the "law of one price" to hold across and within countries except perhaps in the standard commodity case. This assumption has also got broad empirical support (Reinhart, 1995). Its main characteristic is that, based on the conventional theory of demand, the consumer is supposed to maximize utility subject to its budget constraint. The resulting import and export demand functions thus represent the quantity demanded as a function of the level of income, the price of the imported goods and the price of domestic substitutes. Excluding the possibility of inferior goods and of domestic complements for imports, income elasticities and cross-price elasticities are expected to be positive while the own price elasticities are assumed to be negative for aggregate imports or exports (Goldstein and Khan, 1985). The other often-made assumption is that the consumer has no money illusion so that the demand functions are homogenous in income and prices.

By estimating the import and the export demand functions one can thus generate the price and income elasticities. The import and export price elasticities are particularly important to predict a country's balance of payments stability based on the Marshal-Lerner condition. Equally, income elasticities are important since, under certain conditions, the direction of trade balance of a given country depends on its income elasticity of demand for imports and exports. In the case of two countries, this means that the country with

high-income elasticities for its imports than the foreign income elasticity for its exports will face rapid import growth than export growth, deterioration in the trade balance and pressure on its exchange rate (Houthakker and Magee, 1969).

In the perfect substitutes model, the assumption is that a given kind of good supplied by exporters in one country is a perfect substitute for the good of the same kind supplied by any other country. The implication of this assumption is that elasticities of substitution between these supplies are infinite and the corresponding price ratios are constants (Armington, 1969). The demand for the "standard" commodities such as wheat, copper, sugar, etc. is usually modeled on the perfect substitutes framework. In this model, import demand is expressed simply as the excess demand for domestic goods. Hence, estimating import demand for the perfect substitutable good is simply estimating domestic demand and domestic supply, with imports being the residual (Goldstein and Khan, 1985). Of the two models the imperfect substitutes model is widely employed in the empirical trade literature.

3.2 Empirical Literature

In this subsection we review the empirical literature conducted on other countries and on Ethiopia regarding the determinants of international trade flows (imports and exports) with particular emphasis on the demand side.

In analysing the determinants of international trade flows from the import side, most of the early empirical studies relayed on the traditional import demand functions, which relate import quantity demanded to income and relative prices (for instance, see Houthakker and Magee, 1969). However, it is recently recognized that quantitative restrictions, as reactions to foreign exchange constraints, are important in determining the import demand of most developing countries. Hence, "it has been shown that models which do not account for quantitative restrictions often provide misleading guidance to policy prescription" (Ogbu, 1994:1). On the other hand, many studies on export flows presume that exports are determined by the supply-side variables including domestic prices, GDP, taxes, tariff and subsidies. There are, however, fewer studies that deal with the demand-side determinants of exports, such as demand for imports in developed countries or prices in competitor countries (Bond, 1985).

For the purpose of this paper, the empirical studies conducted on import and export demand are grouped in to those that 1) dealt with the estimation of only import demand, 2) estimated only the export demand, and 3) estimated both import and export demand side by side. Those authors who estimated only import demand include, among others, the early works of Hemphill (1974), Khan (1975), Goldstein and Khan (1976), Sundararajan and Subhash (1976), Weisskoff (1979), Boylan and et al (1980). The recent ones in this group are Melo and Vogt (1984), Boylan and Cuddy (1984), Moran (1989), Lopez and Thomas (1990), Umo (1990), Arize (1991), Mwega (1993), Senhadji (1998), Egwaikhide (1999), and Mah (1999).

Hemphill (1974) made a significant effort to explain and to measure the behavioral relationship between imports and foreign exchange receipts of less developed countries. He proposed the stock adjustment import-exchange model as a substitute for the standard import function (which explains import demand as a function of real income and relative prices). He used the data from eight developing countries to estimate his equation and found the results, which were consistent with his hypothesis (i.e. imports are determined by foreign exchange receipts).

On the other hand, Khan (1975) used traditional import demand function and OLS estimation in his study of the import behavior of Venezuela during the period 1953-1972. In his aggregate import demand estimation he found price and income elsticities of -0.897 and 0.239, respectively.

Goldstein and Khan (1976), employing OLS and two-step search method, estimated the import demand functions for 12 industrial countries to empirically test the proposition that the import price elasticity is the function of the size of the relative price change. They found that import demand was responsive to relative prices for 8 of the 12 countries during the period 1955 – 1975 based on quarterly data. Furthermore, real income changes were found to exert a significant influence on aggregate import demand. They also concluded that devaluation has a favourable effect on the quantity of imports. Moreover, they found no evidence that either the price elasticity of demand for imports varied with the size of the relative price change, or that importers adjust faster when faced with larger than with "normal" relative price changes.

On the other hand, Sundararajan and Subhash (1976) criticized the traditional approach to import demand function on the ground that it implicitly assumes either that the unit import requirements of all components of GNP are equal or that the unit import requirements of GNP are negligible. This, they emphasized, commits specification error, resulting in biased estimates. As an alternative to the traditional import functions, they developed an input-output approach to take account of derived demand for products using Korean data. They compared the results obtained based on input-output approach and the traditional approach, and concluded that the input-output analysis is preferable to traditional approach in estimation of the import demand functions.

Weisskoff (1979) who included the trend variable in to the traditional import function found high income and low price elasticities for Brazil. The coefficient of the trend variable was found to be negative reflecting the successful import substitution activity in the Brazilian economy.

Boylan and et al (1980) also used the traditional model to primarily test the functional form of aggregate import demand function for three European economies; Ireland, Denmark and Belgium. Accordingly, they found that the log-linear form was preferred to linear form.

Melo and Vogt (1984) also employed the traditional model to estimate real income and price elasticities of demand for Venezuelan imports. They have found greater income and

price elasticities that suggest, respectively, a progress in the economy and an increase in the degree of 'openness' of the same.

Moran (1989), on the other hand, formulated the general import model by incorporating the traditional variables (the relative prices and domestic income) into the variables identified by Hemphill (foreign exchange receipts and international reserves). He then estimated the Hemphill, the traditional and the general import demand functions using pooled-cross-section time-series data for 21 developing countries over 1970-1983 period. He concluded that the general model should be preferred to either the Hemphill or traditional models. Up on the estimation of the general import model, he has found that while the short-run income and price elasticities oscillate around 0.2 and –0.1, respectively, the long-run income and price elasticities were within the respective range of 0.2 and 0.4, and –0.4 and –0.3.

Lopez and Thomas (1990) included absorption and its components as the determinant of imports and the ratio of exports to debt as an indicator of foreign exchange availability. They estimated import demand for seven Sub-Saharan African countries (Cote d'Ivoire, Kenya, Madagascar, Nigeria, Tanzania, Zaire and Zambia) between 1977-1986. Their findings suggest that adjustment programs that include exchange rate depreciation and aggregate demand reduction are likely to reduce imports.

Umo (1990) also estimated the aggregated and the disaggregated import demand for Nigeria. Defining imports as a function of relative prices, real per capita income and

external influence, proxied by capital inflow, he concluded that relative prices and real per capita income are statistically significant but external influence is not.

On the other hand, Arize (1991) found significant income variable for Malaysia, Philippines and Thailand with the relative price being greater than unity only for Philippines.

Mwega (1993) also used an error correction model to estimate demand elasticities for aggregate imports and components for Kenya over 1964-1991. In his equation, he defined real imports as a function of lagged real imports, relative import prices, real income, lagged foreign assets held by the monetary authorities and current foreign exchange receipts from exports and net capital inflows. After fitting an error correction model to aggregate imports, he concluded that while previous imports, lagged foreign exchange reserves and receipts affected current imports significantly, relative price and real income aggregate import demand elasticities were found to be non-significant.

Senhadji (1998), on the other hand, derived an aggregate import demand equation that is close to the standard import demand function except that he included the activity variable as GDP minus exports rather than GDP. In his cross-country analysis, he used the data from World Bank database for 77 developed and developing countries during 1960-1993. He then estimated the co-integrating vector both by Ordinary Least Squares (OLS) and by the Phillips-Hansen fully modified (FM) estimator and obtained the results that while average price elasticity is close to zero in the short-run, it is slightly exceeds one in the

long-run. The short-run income elasticities are on the average less than 0.5 but they are close to 1.5 in the long run. He has also concluded that industrial countries tend to have significantly higher income elasticites and lower price elasticities than the developing countries.

Egwaikhide (1999) adopted an error correction model to examine the determinants of aggregate import demand and its major components (consumer goods, raw materials and capital goods) in Nigeria during the period 1953-1989. His model specification is based on both the traditional and Hemphill import demand functions. His main conclusion was that foreign exchange earnings, relative prices and real output significantly explain the growth of total imports in the short-run with the effect of foreign exchange availability being remarkable. The study by Mah (1999) also estimated import demand elasticity for Thailand to test the Melo-Vegot hypotheses[7] that income and price elasticities of import demand increase with import liberalization and economic development, respectively. He obtained results that the income elasticity increases with liberalization of imports but price elasticity failed to increase with economic development.

In the second category such authors as Bond (1985, 1987), and Senhadji and Montenegro (1998) dealt with the estimation of only export demand. Bond (1985) estimated export demand using annual data from 1967 to 1981 and OLS estimation procedures for groups of non-oil developing countries containing a sample of 36 countries. He found that the exports from non-oil developing countries are strongly influenced by real exchange rate

[7] Melo and Vogt (1984) used data from Venezuela to test their hypotheses and concluded that these hypotheses would hold. Boylan and Cuddy (1987) however rejected them for the Republic of Ireland.

changes and the short-term fluctuations in GNP in the industrial countries appear to have a greater impact on their exports. Bond (1987) also estimated export demand for five developing country regions and five primary commodity groups. His results indicated the inelastic nature of price and income responses in the demand for primary commodities exported from developing countries. The recent study by Senhadji and Montenegro (1998) also estimated export demand elasticities for 53 industrial and developing countries based on time series techniques that address the nonstationarity in the data. They found that the average long-run price and income elasticities are approximated to be -1 and 1.5, respectively. It was also concluded that developing countries faced lower price elasticities than developed countries. Asian countries, on the other hand, had significantly higher price elasticities than both developed and developing countries. Moreover, they had high-income elasticities than developing countries. However, Africa had the lowest income elasticities depicting largely the type of the product exported from the continent.

Other authors who estimated import demand and export demand side by side are, inter alia, Houthakker and Magee (1969), Khan (1974), Goldstein and Khan (1978), Warner and Kreinin (1983), Bahamani-Oskooee (1987), and Reinhart (1995). Hauthakker and Magee (1969) were most probably the first to systematically estimate import demand and export demand side by side based on the traditional functions. In their estimation of income and price elasticities for 15 developed countries, they found that the sum of the import and export price elasticities was greater than one in absolute terms, as required for balance of payments stability. Khan (1974), on the other hand, estimated both import and export demand functions for 15 developing countries. He concluded that prices do play an

important role in the determination of imports and exports of developing countries. He further indicated that the size of the estimated price elasticities is found to be fairly high for the sample countries and hence Marshall-Lerner condition for successful devaluation could easily be fulfilled for these countries. Warner and Kreinin (1983) in their estimation of import and export demand elasticities for 19 developed countries found various results for import demand but the exchange rate and the price of competing countries were the main determinants of exports. Similarily, Bahamani–Oskooee (1987) estimated both functions for seven developing countries using quarterly data for the period 1973-1980. He concluded that the estimated price elasticities of import and export are low indicating that relative prices do not have significant effect on imports and exports of the countries under study. On the other hand, income elasticities for imports are generally high but that of exports are low.

The recent study by Reinhart (1995) also undertook the estimation of import and export demand elasticities for twelve developing countries (three from Africa, four from Asia and five from Latin America), using Johansen's co-integration framework. She found that relative prices are significant determinant of the demand for imports and exports. However, price elasticities tend to be low and in most cases well below unity. It was also concluded that the industrial country income elasicities are higher for Asia and Latin America but lower for Africa probably because of greater dependence on primary commodity exports of African countries. On the other hand, the estimation of export demand by Goldstein and Khan (1978) was somewhat different from the above estimation in the sense that they used the simultaneous equation approach for eight developed

countries. In their estimation of export demand and supply equations simultaneously, they have found significant relative price and income elasticities in the export demand equation.

In the case of Ethiopia, even if very few studies have been conducted on the import demand elasticity including that of Muluneh (1982), Haile (1994), and Solomon (2000), study on the export demand elasticity is scant (Haile 1994 also estimated export demand side by side with import demand). Muluneh (1982) defined Ethiopian imports as a function of lagged GDP and lagged foreign exchange earnings. Even though he did not test for the stationarity of the data and use an error correction model, he estimated the aggregate and component import elasticities. His results indicated that aggregate imports were negatively related with lagged income with elasticity of –0.5 but positively related with foreign exchange earnings with elasticity of 1.2. Components wise, the income elasticity of imports of raw materials, semi-finished goods, fuel, capital goods and consumer goods were found to be –1.5, 0.3, -0.01, 0.9 and –0.2, respectively.

Gebeyehu (1983), on the other hand, analysed the export performance of Ethiopia on the demand side and compared it to the performance of eight African countries. He employed what is known as Constant Market Share (CMS) approach for his analysis which rests on the basic assumption that a country's export share in world markets should remain uncharged over time. His main conclusion was that the performance of Ethiopia's export was better in the 1960's in the standard of African countries. He further concluded that increase in world trade in general is a necessary condition for the better export

performance. For him, the sufficient conditions, however, include product and markets diversification and improvement in the competitiveness position of export products by way of reducing costs of production and improvement in quality.

Haile (1994) also estimated import and export demand elasticities, based on the traditional equations, using the OLS estimation method. He specified quantity imported (value deflated by unit value index) as a function of GDP, real exchange rate and relative price (ratio of import price index to consumer price index). On the other hand, quantity exported (coffee in tons) was defined as a function of world GDP index, real exchange rate, export price per unit of Ethiopian coffee and export price per unit of Kenyan coffee (to take in to account the effect of competition from other countries). He has then found that domestic GDP and real exchange rate significantly affect Ethiopian imports and the relative price was negatively related with the quantity imported. On the export demand side, the quantity of coffee exported is positively related with world GDP index indicating that the demand for coffee exports is income inelastic. The unit price of Kenyan coffee has positive relationship with quantity exported depicting that the Kenyan coffee and the Ethiopian coffee are close substitutes. As already mentioned, however, his study was based on the traditional import demand function and does not include the effect of quantitative restrictions. The sample size used for the study was also relatively small.

Solomon (2000) conducted the recent study on the import demand for Ethiopia. He used the general import model and estimated import demand elasticities based on both Engle-Granger and Johansen cointegration approaches. He has found insignificant or weak

relative prices and income elasticities suggesting that devaluation and aggregate demand policies could not effectively help to improve the current account and balance of payments deficits. However, as the researcher himself pointed out the following two problems are associated with his study.

> *i) the available data specially, data on import prices didn't represent strictly true import price data of Ethiopia; that might place suspicion on the efficiency of parameter precision, ... ii) the sample size of 36 which is relatively small to use the recent econometric technique may create small sample property bias in the estimation (Solomon, 2000: 79).*

In the presence of these problems, therefore, it is somewhat difficult to believe the results of the estimation and the policy conclusions drawn from them. Hence, there is a need to address these problems by at least estimating the import price that is representative for Ethiopia and by employing large sample size in the estimation procedure.

Berhane (2000) also undertook a study on the determinants of export performance of Ethiopia using an equation which is neither the export demand nor export supply but which includes both demand and supply factors together, termed as export determination model. The dependent variable is export supplied from Ethiopia and the independent variables include world demand (proxied by world export), exchange rate, domestic demand (proxied by domestic credit), relative price of export and tax rate. He has found that world demand is the serious constraint to export and that the domestic demand affects export negatively. He estimated an error correction model based on the Engle-Granger two-step procedure. This procedure, however, is highly criticized for not being applicable

in the presence of multiple co-integrating vectors. Furthermore, it is important to conduct an explicit study on the demand for Ethiopian exports rather than implicitly including it as one of the independent variables in the export determination model.

For the purpose of clarity and to facilitate comparison between the results of the current study and the previous works, the previous empirical outcomes are summarized in Table 2.1 and Table 2.2 (Table 2.1 and Table 2.2 summarize import demand and export demand elasticities, respectively).

Table 2.1 Summary of Selected Empirical Evidence on Import Demand Elasticities

Author	Country	Relative Price	Income	Int'l Reserve	Forex Receipt
Khan (1974)	15 LDCs	-2.3 to -0.2	-0.3 to1.9	-	-
Khan (1975)	Venezuela	-0.897	0.239	-	-
Goldstein & Khan (1976)	12 DCs* (SR)	-0.811 to 0.33	0.85to 2.04	-	-
	7 DCs (LR)	-0.86 to –0.34	0.98to 2.09	-	-
Sundararajan & Subahash (1976)	Korea	-1.651	-	-	-
Weisskoff (1979)	Brazil	-0.37	2.33	-	-
Boylan et al (1980)	Ireland	-0.45	1.84	-	-
	Denmark	-7.84	1.58	-	-
	Belgium	-6.24	1.75	-	-
Muluneh (1982)	Ethiopia	-	-0.5	-	1.2
Melo and Vogt (1984)	Venezuela	-2.086	1.879	-	-
Bahamani-Oskooee (1986)	7 LDCs	-0.66 to -0.06	0.06 to1.68	-	-
Moran (1989)	21 LDCs	-0.06	0.24	0.05	0.45
Umo (1990)	Nigeria	-0.175	0.722	-	0.54
Lopez & Thomas (1990)	Cote d'Ivoire	-0.61	0.97	-	-
	Kenya	-0.36	0.55	-	-
	Madagascar	-0.83	3.34	-	-
	Nigeria	-0.66	1.07	-	-
	Tanzania	-0.54	0.74	-	-
	Zaire	-0.74	2.79	-	-
	Zambia	-0.35	-0.04	-	-
Arize (1991)	Malaysia	-0.08	2.2	-	-
	Philippines	-1.36	0.69	-	-
	Thailand	-0.55	0.56	-	-
Mwega (1993)	Kenya* (SR)	-0.16	0.89	0.16	0.13
	(LR)	-0.40	0.45	0.16	0.34
Ogbu (1994)	Kenya	-0.17	1.19	0.15	-
Reinhart (1995)	Africa (3 LDCs)	-1.363	1.138	-	-
	Asia (4 LDCs)	-0.403	1.386	-	-
	Latin Am. (5LDCs)	-0.357	0.964	-	-
Senhadji (1998)	66 Countries* (SR)	-0.86 to -0.01	0.00 to 1.36	-	-
	(LR)	-6.74 to -0.02	0.03 to 5.45	-	-
Egwaikhide (1999)	Nigeria	-0.895	0.588	-	0.308
Mah (1999)**	Thailand	-1.615	0.216	-	-
Solomon (2000)	Ethiopia* (SR)	-	0.22	0.56	-
	(LR)	0.32	0.86	3.56	-
Haile (1994)	Ethiopia	-0.52	2.35	-	-

* SR = Short run elasticity, LR = Long run elasticity.

** He estimated 10 different equations. This result is based on the one where the equation takes dummy at 1974 (see Mah 1999:500).

Source: Compiled from each study.

Table 2.2. Summary of Selected Empirical Evidence on Export Demand Elasticities

Author	Country	Relative Price	Income
Bond (1985)	Non-oil LDCs	-	2.39
Bahamani-Oskooee(1986)	Brazil	-0.280	0.04
	Greece	0.049	0.189
	India	-0.646	0.422
	Israel	-0539	-0.357
	Korea	-0.39	0.118
	South Africa	-0.031	0.279
	Thailand	0.110	-0.110
Bond (1987)*	Africa	-0.68	0.54 to 5.10
	Asia	-0.32	0.46 to 3.56
	Europe	-0.22	1.12 to 2.91
	Middle East	-0.25	0.26 to 2.52
	Western Hemisphere	-0.21	0.51 to 1.74
Reinhart (1995)	Africa (3 LDCs)	-0256	1.253
	Asia (4 LDCs)	-0.398	2.494
	Latin America (5 LDCs)	-0.192	2.069
Senhadji & Montenegro (1998)	53 LDCs & DCs ** (SR)	-0.96 to -0.0	0.02 to 1.15
	(LR)	-4.72 to -0.02	0.17 to 4.34
Haile (1994)	Ethiopia	-	0.88

* The first number of income elasticity refers to agricultural products and raw materials for Africa and Asia, food for Europe, minerals for Middle East and beverage and tobacco for Western Hemisphere, while the second is energy for Africa, Asia and Middle East, minerals for Europe and Western Hemisphere.

** SR = Short run elasticity, LR= Long run elasticity

Source: Compiled from each study.

CHAPTER THREE: THE ETHIOPIAN EXTERNAL TRADE SECTOR- An Overview

Ethiopia is one of the poorest nations in the world. Its real per capita income does not exceed $100; poverty is highly pronounced, education is at low level, life expectancy is low, and infant mortality is high[8]. The growth in real GDP averaged only 2.8 percent and that of agriculture, which is the mainstay of the economy, was only 1.6 percent during 1974/75-1999/2000. Real GDP grew by 1.9 percent and 4.7 percent during the military regime and after its downfall, respectively. Even if greater emphasis has been given to agriculture currently, its growth is not impressive. Its growth was 1.8 percent vis-à-vis 6.9 percent, 7.3 percent and 8.3 percent growth in industry, distributive services and "other services", respectively during 1991/92-1999/2000 (Appendix 1).

It is under such economic conditions that the country has joined the economic integration of the global economy, which has been intensified through globalization[9,10]. The fact that the country is part and parcel of the world economy is obvious. First, it is a member of regional and international organizations. Second, it has been pursuing the IMF/World Bank sponsored program since 1992 that makes the economy more open to the external world.

[8] See Befekadu and Berhanu (1999/2000).
[9] See Befekadu (1999) for the logic and justification for globalization.
[10] This has been driven by a fast move towards trade and capital market liberalization, increasing internationalization of corporate production and distribution strategies, and fast technological change (World Bank, 1995).

Hence, its linkage to the global economy takes various forms in which international trade is one aspect. It supplies some of the commodities to the international market and consumes those that are not locally produced from the same.

Its pattern of foreign trade, however, reveals the familiar developing country case. While few primary commodities overwhelm exports, the lion's share of imports consists of manufactured goods, fuel and semi-finished goods. Exports generally depict a sluggish growth but imports record a faster growth resulting in persistent trade deficit for a long time.

3.1 The Export Sector

About 90 percent of the export commodities are obtained from agriculture and products derived from them. These export items include such items as coffee, oilseeds, pulses, hides and skins, vegetables and fruits, beeswax and live animals. From this, it is vivid that the export sector is characterized by over-dependence on agricultural products. Since agriculture, in general, is under the vagaries of nature, particularly in the Ethiopian case, the high concentration on non-traditional export goods resulted in an unstable export performance. What is more, the sector is highly susceptible to the erratic nature of prices and unpredictable demand in the international market. Consequently, the contribution of the export sector to the growth of the economy has been very low (Ghiorgis, 1992). For instance, the export sector contributed 15 percent to GDP and the export taxes make up 1.5 percent of the total central government revenue (excluding grants) in 1999/2000.

3.1.1 The Structure of Exports

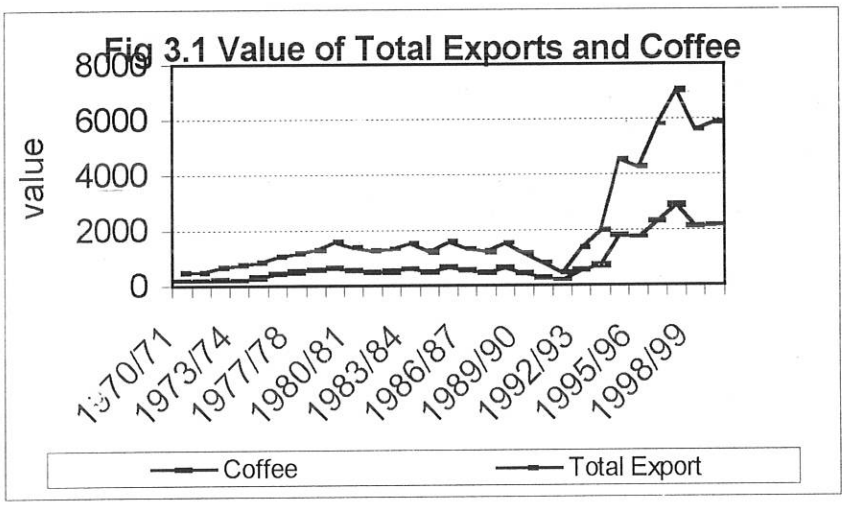
One of the major problems of Ethiopia's export sector is that its structure is concentrated on few primary commodities. This structure has not significantly changed overtime. The achievements of current reform program are below expectations, as it has not led to a radical shift in the structure of exports. Coffee has still remained to be the dominant export commodity. It accounted for an average of 60 percent of export receipts between 1970/71 and 1999/2000 (Appendix 2). Oilseeds, hides and skins, pulses and *Chat* constituted 4.3 percent, 12.2 percent, 4.5 percent and 3.7 percent during the same period, respectively. The share of coffee together with the latter four items averaged 84.8 percent. This confirms the limited diversification of the export sector in the contrary to the country's export dependence.

The shift towards the export of manufactured goods is not impressive. The export of processed goods contributed, on the average, only 5 percent to the total export earning during the mentioned period.

Apparently, the absence of diversification and the high dependency on specific commodities makes the export sector be exposed to external shocks. Specifically, the heavy reliance on a single commodity, i.e. coffee, has a negative effect on export receipts and the stability of the economy in general.

A. Coffee

As already noted, the coffee sector is the principal foreign exchange earner for the country. Even in the world, it constitutes the world's second largest international export commodity next to petroleum. To this end, Fig. 3.1 shows that, despite certain variations, the sector constituted greater proportion of export earnings in Ethiopia. The sector also provides direct and indirect employment opportunities for more than 25 percent of the population[11].



Arabica coffee that contributes more than 75 percent of the world's coffee production is believed to be indigenous to Ethiopia. Because of this, the country is Africa's leading exporter of Arabica coffee, which is the best quality (ECEA, 1998). It is also plausible to say that, the country is unique in Africa in the sense that there exists high domestic consumption of coffee.

[11] Coffee and Tea Authority

Coffee in Ethiopia is grown mainly in the south and southwestern and eastern part of the country. The dominant producers[12] are Oromiya and South Nation, Nationalities and Peoples Regions. The bulk of the coffee production comes from the smallholders. There are about 70,000 coffee small holders that produce 95 percent of total production in the country (ICO, 1998).

The sector, though crucial for the economy, has not been yet developed. During the Imperial regime, there had been some commercial farms until they were nationalized by the Derg regime. There had also been market-based marketing structure during the period. Coffee had been shipped to the central markets at Addis Ababa and Dire Dawa where auctions were conducted.

The situation was, however, changed when the economy was under the whim of socialist ideology. Small producers were forced to sell coffee to service cooperatives and the Ethiopian Coffee Marketing Cooperation (ECMC), which caused lack of incentives to increase production. Export of coffee was almost entirely conducted through ECMC. Taxes levied on coffee were substantial.

According to the World Bank (1987), the taxes on coffee at the time, that is, coffee surtax, 2 percent transaction tax, an export duty and coffee cess took up 37 – 50 percent of the coffee export (f.o.b.) price. As a result, the producer prices were too low discouraging small farmers to produce coffee. Due to all these burdens on farmers, " there were several

[12] Presently, four types of coffee production modes exist in the country (CTA, 1999). These are the forest coffee, the semi-forest coffee, the garden coffee, and the plantation coffee.

cases where farmers had to uproot their coffee trees and replace with *Chat* or plant cereal crops on the land" (Itana 1999:76). Furthermore, the strict control on coffee by the regime led to the smuggling of coffee to neighbouring countries such as Kenya, Djibouti and Sudan (Dercon and Lulseged, 1994).

Currently, however, the government has adopted various measures to remove the bottlenecks that the sector has faced. Taxes have been reduced and the previous three types of taxes (coffee duties, surtax and coffee cess) consolidated in to a flat rate of 6.5 percent of f.o.b price (See Proclamation No. 99/1998). Moreover, the devaluation of the national currency has been adopted with an intention of providing incentives for exporters of coffee and other items alike.

Even though the country is believed to be the origin of coffee Arabica, its supply in the world market is extremely low. Its share of world coffee trade does not exceed 2.7 percent (Appendix 3). The smallest share of 0.9 percent was registered in 1991/92 due to the negative effect of the war on the economy. The largest share was 2.7 percent recorded in 1997/98. Moreover, the amount of coffee that is delivered to the terminal markets, i.e. Addis Ababa and Dire Dawa showed volatility. For instance, the average delivery was 98,755 tons during 1978/79 -1982/83 coffee year (Table 3.1). This declined to 70,262 tons, 95,454 tons and 74,974 tons during 1983/84-1985/86, 1986/87-1988/89 and 1989/90 -1991/92, respectively. However, a recovery was observed after 1992/93.

Table 3.1: Average Coffee Arrivals by Coffee Year at Addis Ababa and Dire Dawa

Coffee year*	Unwashed	Washed	Total
1978/79 - 1982/83	87,555	11,200	98,755
1983/84 - 1985/86	70,262	12,662	82,924
1986/87 - 1988/89	76,668	18,786	95,454
1989/90 - 1991/92	60,654	14,320	74,974
1992/93 - 1994/95	90,238	14,957	105,195
1995/96 - 1997/98	133,303	20,870	154,173
1998/99 - 1999/2000	117,825	27,824	145,649

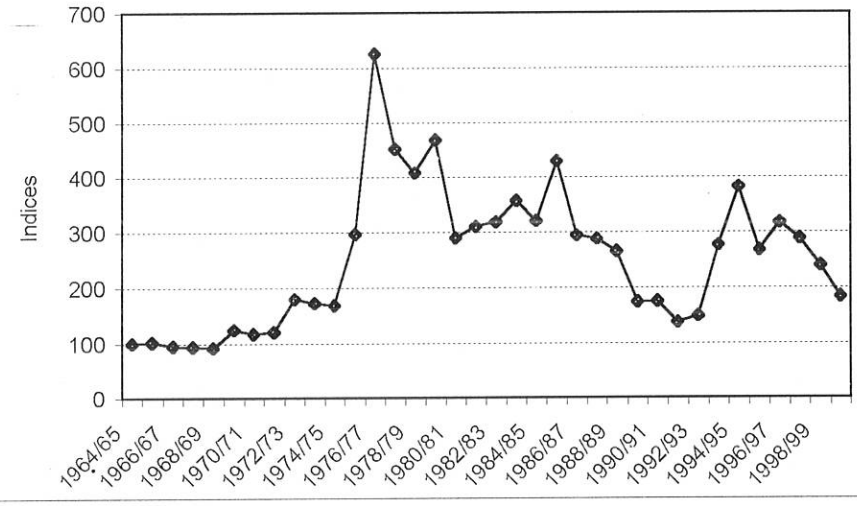
*Coffee Year is between October to September.
Source: Coffee and Tea Authority.

Among the major determinants of coffee supply in the world market is its international price. When there is improvement in the coffee price, there would be a subsequent rise in its supply. Particularly, since Brazil is the major competitor of coffee Arabica, price fluctuation depends on the production and supply of coffee from that country. Whenever the coffee production is boosted in Brazil, the world price for coffee falls.

If we look at the world price for coffee, prices gradually declined in the 1960's, but increased until early 1970s (fig. 3.2). After showing marginal decline in mid 1970s, prices again surged up, as the Brazil coffee was hard hit by frost in 1974/75. Afterwards, a significant rise in prices was registered in 1985/86 and 1994/95. Again, the increase was attributable to lower supply of coffee from Brazil in both years[13].

[13] Coffee and Tea Authority

Fig. 3.2 Indices of ICO Annual Average Indicator Prices for Coffee (1964/65=100)



Ethiopia exports washed and unwashed coffee. However, washed coffee fetches higher prices over the unwashed one. As can be seen from Annex 3, the unit prices of washed coffee was greater than that of unwashed coffee in all years indicated. But in terms of volume exported the unwashed coffee exceeds the washed coffee by far. During 1976/77 and 1999/2000 while the export of unwashed coffee averaged 70,346 tons, the washed coffee was only 12,521 tons. This implies that there is a need to invest in quality improving technologies to obtain the possible benefit from the export of coffee.

In terms of the volume of coffee export, there was generally an increasing trend. Both washed and unwashed coffee showed an increase of 17.1 percent and 2.4 percent at the end of 1994/95 from 1984/85 (Appendix 4), respectively. This surged up to 31.2 percent and 102.6 percent in 1999/2000. According to Naude (1998), "because it takes 4-5 years for a coffee tree to start carrying, this increase in exports could have come from exports

formerly smuggled." This is particularly true in the case of increases in coffee exports in the early reform period.

In addition to the above, another problem associated with the marketing of coffee, in general, is the remoteness of most coffee-growing regions from the centers which leads to substantial costs of transporting coffee to the auction centers, to port, and to importing countries. These transport costs may not change no matter what the prices of coffee in the world market. As already mentioned, all coffee is auctioned either at Addis Ababa or Dire Dawa, which are at far distance from the coffee growing regions. Furthermore, weather conditions affect both the quantity and quality of coffee export. External factors that impede the export of coffee include the variability of international prices and the existence of competing coffee from other countries with better quality than the country's coffee.

B. Non-Coffee Exports

The major non-coffee export commodities of the country include, among others, oilseeds, pulses, hides and skins, *Chat*, sugar, oilcakes, live animals, meat and meat products and beeswax. The volume of non-coffee exports was, on the average, 340.4 thousand metric tons between 1972/73 and 1974/75 but declined to 148.6 thousand metric tons during 1990/91 - 1992/93 (Table 3.2). After showing a recovery to 230.4 thousand metric tons between 1993/94-1995/96, it again went down to 168.4 thousand metric tons during 1996/97-1998/99.

The downward trend in the volume of non-coffee exports was entirely attributed to the decline in the export of almost all components. Exports of oilseeds and pulses, which constitute larger share of non-coffee exports in the early 1970s, showed a significant decline at the eve of the present reform program. These two items experienced a substantial decline from earlier respective position of 100.2 and 122.4 thousands metric tons between 1972/73 and 1974/75 to 1.0 and 5.9 thousand metric tons through 1990/91 - 1992/93, but revived to 44.0 and 30.4 thousands metric tons during 1996/97-1998/99. The main reason for such decline is that the peasants shifted towards the growing of cereals for their food requirements as well as the profitability of cereals was more than that of oilseeds and pulses (World Bank, 1987). The export volumes of hides and skins, meat and meat products, fruits and vegetables, sugar and molasses, live animals and beeswax also followed the same lines of development. On the other hand, the export of oilcakes went down to nil in the most recent years. The export of *Chat*, however, increased to the extent that it surpasses the level in the 1970s.

Table 3.2: Annual Average Volume of Major Non-Coffee Exports

(In Thousands of Metric Tons)

Period	Oilseeds	Hides& Skin	Pulse	Meat &Meat prod.	Fruits & Veg.	Sugar & Molasses	Oilcakes	Live Animals	Chat	Petrol Prod.	Bees Wax	Total
1972/73-1974/75	100.2	12.1	122.4	9.1	28.1	18.1	38.7	8.7	2.2	0.0	0.6	340
1975/76-1977/78	30.8	9.4	75.7	2.0	15.9	16.0	32.0	8.1	2.0	0.0	0.6	192
1978/79-1980/81	10.3	19.3	28.1	1.8	7.1	25.7	25.6	2.4	1.8	0.0	0.5	122
1981/82-1983/84	18.3	9.7	56.0	2.5	7.9	37.1	29.8	4.1	2.7	0.0	0.4	168
1984/85-1986/87	10.1	10.7	10.4	1.2	11.3	43.8	6.6	6.3	1.7	125.1	0.3	227
1987/88-1989/90	10.0	9.0	16.2	0.8	9.9	32.4	5.5	10.6	1.9	189.0	0.2	285
1990/91-1992/93	1.0	5.0	5.9	0.1	8.7	15.4	1.0	0.9	1.2	109.3	0.1	148
1993/94-1995/96	10.0	8.4	21.6	0.5	18.1	5.1	0.0	1.1	3.5	161.8	0.3	230
1996/97-1998/99	44.0	7.4	30.4	1.9	19.4	6.6	0.0	1.2	6.9	46.4	0.6	164

Source: Compiled from NBE Quarterly Bulletin, Various Issues

When we consider the export value of these items, it also followed the same trend, as was the case in volume. The value declined from USD 131 million during 1972/73 -1974/75 to the lowest figure of USD 62.6 million between 1990/91 and 1992/93 (Table 3.3). The latter lowest value was recorded due to the lower export volume during the period. Nevertheless, a reasonable foreign exchange earnings was obtained and reached to the peak of USD 1043.4 million during 1996/97 - 1998/99. This was mainly obtained from the export of *Chat*, hides and skins, and oilseeds that registered USD 305.6 million, USD 300.3 million and USD 220.1 million, respectively.

As already noted, the export of non-coffee products did not perform well in terms of both the volume and the earnings received since 1970s until early 1990s. As a result of the significant decline in non-coffee exports, the share of coffee in total export then rose markedly.

Table 3.3: Annual Average Value of Major Non-coffee Exports (In Millions of USD)

Period	Oilseeds	Hides & Skins	Pulse	Sugar & Molass	Fruits & Veg.		Oilcakes	Live Animals	Chat	Petr. Prod.	Bee Wax	Total
1972/73-1974/75	38.3	26.2	37.5	7.1	4.6	5.1	3.6	5.6	2.2	0.0	1.1	131
1975/76-1977/78	11.9	24.7	21.2	2.1	3.3	2.1	4.0	5.9	2.5	0.0	1.6	81
1978/79-1980/81	8.3	54.6	10.7	2.2	2.4	3.9	3.8	3.2	7.9	0.0	2.0	99
1981/82-1983/84	10.5	42.6	12.8	3.4	2.9	4.4	4.7	6.3	14	0.0	1.4	103
1984/85-1986/87	5.0	45.4	4.6	1.8	4.0	5.2	0.7	7.6	9.8	8.5	0.8	93
1987/88-1989/90	6.7	62.8	8.8	1.4	6.2	10.0	0.4	10.3	8.4	13.1	0.6	128
1990/91-1992/93	0.7	33.2	2.9	0.2	3.1	3.3	0.0	1.0	8.5	9.4	0.3	62
1993/94-1995/96	45.4	295.6	69.4	6.3	15.2	9.3	0.0	6.4	151	76.5	6.7	682
1996/97-1998/99	220	300.3	97.5	28.4	39.3	2.0	0.0	9.2	305	31.1	9.9	1043

Source: Compiled from the NBE Quarterly Bulletins, Various Issues

Specifically, the export of processed goods such as oilcakes, sugar and molasses, and petroleum products declined after the reform program despite the removal of the policy constraints including the overvaluation of the national currency and export taxes. The problem, therefore, lies not only on the policy constraints but also on other structural constraints as can be observed from the following quotation.

> *This puts the crux of the problem not on these broad policy issues related to liberalizing foreign trade, but on the capabilities of firms to go through the necessary processes of technological change to achieve a sufficient level of productivity increment in order to be competitive in the international market, on the one hand, and a concerted country wide strategy to encourage the development of such firms geared towards the promotion of manufactured exports on the other. The absence of clear*

strategy towards the manufacturing sector and the orientation of the existing manufacturing sector towards meeting the consumption requirement of the domestic market, has meant that little attention has been paid to improve the efficiency of firms and the quality of their products to enable them to export at desired level (Befekadu and Berhanu, 1999/2000:225).

3.1.2 Direction of Exports

Ethiopia's export concentration is observed not only on the type of commodities exported, but also on the markets to which exports are destined. The flow of exports has remained to be in the same route as had been for a long time. Among the most important markets are America, Europe and Asia. Africa's share of the country's exports has been limited.

As can be seen from Table 3.4, the share of Africa had been the lowest in the specified period. It was relatively large in the 1990s. On the other hand, the share of America (both North and Latin America) had been the largest in the 1960s and the beginning of the 1970s. Its share was 42.1 percent, 73.4 percent and 48.8 percent in 1961, 1965 and 1970, respectively. From 1970 onwards, its share showed a declining trend owing to ideological differences between the two countries until the current government has changed it. Even after the reform, America's share has declined to the lowest share of 5.6 in 1999. Europe was, on the other hand, an important outlet for the country's export as far as back to the 1960s. Its share was rising overtime and reached 40.9 percent in 1999 from 29.4 percent in 1961. Similarly, Asia has become the main importer of Ethiopia's commodities.

Table 3.4: Percentage Share of Exports by Continent and Major Countries for Selected Years

Continent	1961*	1965	1970	1975	1980	1985	1990	1995	1999
Africa	5.1	6.0	6.4	22.4	13.4	6.1	12.6	11.5	18.0
Djibouti	3.2	3.8	5.1	11.4	15.2	11.9	9.1	9.1	9.5
Egypt	0.3	0.3	0.2	0.0	0.0	0.0	0.8	0.8	2.6
Kenya	0.4	0.4	0.3	0.2	4.9	0.3	0.2	0.2	0.1
Europe	29.4	37.0	25.3	22.4	50.8	59.2	45.2	52.8	40.9
Belgium	0.2	0.0	0.0	0.0	1.2	6.8	3.0	1.7	3.5
France	2.8	3.7	2.2	2.4	6.6	15.8	2.7	5.0	4.7
Germany	1.9	5.9	7.3	11.6	8.9	11.3	17.4	29.1	18.1
Italy	9.7	8.6	6.2	4.2	10.1	32.3	7.5	8.6	6.7
Dutch	2.4	0.0	0.0	0.0	2.0	55.4	2.6	1.6	1.5
U.K.	6.2	4.8	1.9	2.8	2.1	13.4	2.9	3.6	2.4
America	42.1	73.4	48.8	30.0	18.1	10.5	13.6	7.0	5.6
Canada	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8
US	42.0	73.4	48.8	18.9	18.1	44.0	10.7	6.4	4.9
Asia	22.0	16.9	19.4	28.8	17.1	23.8	27.5	28.4	35.2
Japan	2.1	0.0	0.0	0.0	6.4	43.0	14.7	13.0	13.2
Saudi Arabia	5.3	0.0	0.0	0.0	7.6	15.4	10.9	9.0	11.7

*End of June 1961.

Source: Computed from the NBE Quarterly Bulletins, Various Issues.

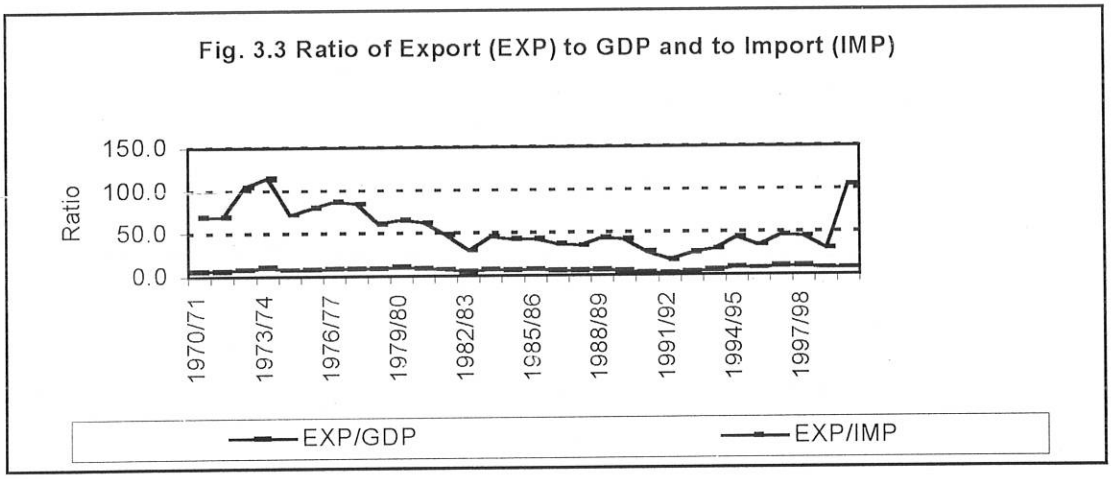
In Africa only Djibouti imports the largest share of Ethiopia's exports. Its share was 1.9 percent in 1961 but increased to 9.5 percent in 1999. The most important European markets are Germany, Italy, France and United Kingdom. In particular, Germany is the leading importer of the Ethiopia's goods in Europe. Its share was the largest in 1985 and significant

then after as compared to that of other countries. United States from the American block, Japan and Saudi Arabia from Asia are major destinations to the country's exports.

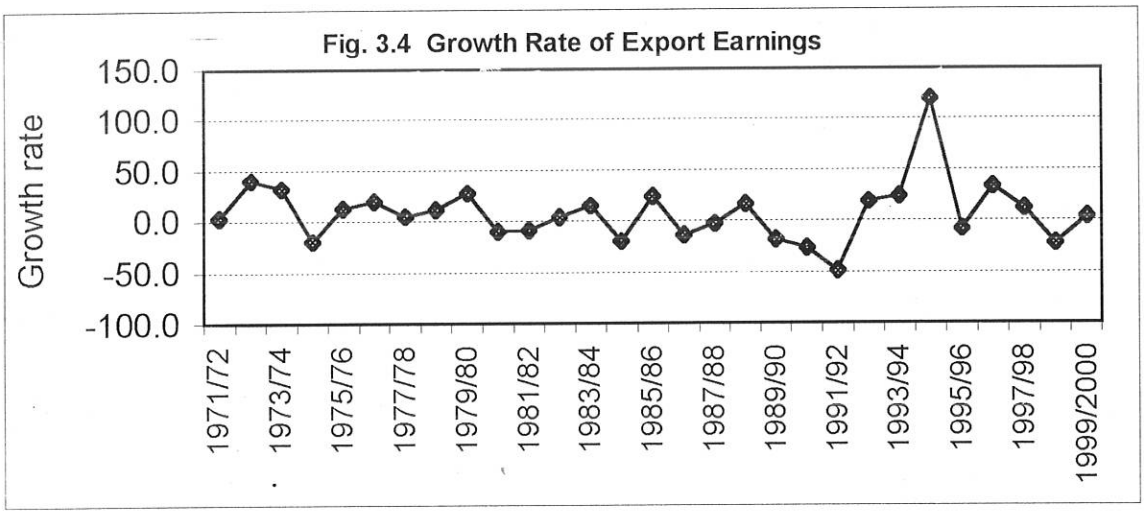
It is, therefore, clear that the markets for the country's exports are confined to few industrial countries that are price makers in the international markets. Specifically, trade with African countries is very much limited despite strong efforts made by African leaders to promote regional trade and integration through various initiatives (Oramah and Abou-Lehaf, 1998:263). According to them, Ethiopia is one of those counties that would not gain as much from intra-Africa trade potentials due to poor correspondence of its exports to imports of economically advanced African counties. Hence, in order to enhance the foreign exchange earning capacity of exports and ensure the continuity of exports, there is a need to diversify the destination of exports by searching markets in industrial counties in addition to the existing ones.

3.1.3 The Performance of the Overall Exports

In the 1970s and 1980s the export sector of the country has generally revealed a sluggish performance. This can particularly be observed if we look at the ratio of exports to GDP and imports as well as the growth rate in export earnings. Accordingly, exports as a percentage of GDP that registered 8.1 percent in the 1970s declined to 6.1 percent during 1980s (Appendix 5 and Fig. 3.3). In particular, export earnings have showed a general stagnation and a declining trend in the 1980's as its growth rate was averaged –1.4 percent during the period (Appendix 5, fig. 3.4).



Due to such unsatisfactory performance of the export sector, receipts obtained there from were insufficient to finance imports. Exports had covered 80.3 percent and 42.4 percent in the 1970s and 1980s, respectively. This implies that the import of basic investment goods had been hampered by the poor export performance.



The poor performance of the export sector during 1980s was attributed to different factors. These include, among others, bad weather conditions, problems in production and marketing, pervasive impact of international commodity market on exports and low elasticity of demand

and supply for exports (Ghiorgis, 1992, Alemayehu, 1999). The significant overvaluation of exchange rate together with high export taxes also contributed to the reduction of the profitability of exports in terms local currently (World Bank, 1987).

In the early 1990s, the declining trend in exports was even severe. Export earning was only 1.5 percent of GDP and covered 17.6 percent of imports in 1991/92 (Fig. 3.3 and Appendix 5). This was the lowest figure ever registered during 1970/71 to 1999/2000. The main reason for such abysmally low record in export earnings was the heightened civil war in the country at the time. However, if we assess the 1990s in general, there was a sign of recovery in the export performance. Export earnings grew on the average by 10.8 percent during the 1990s vis-à-vis the decline by 1.4 percent in the 1980s. This recovery in exports is attributed to good weather conditions and partly to current policy reforms. Even if exports relatively grew, the percentage of import payments they covered in the 1990s (40.2) was lower than that of 1980s (42.4 percent) mainly due to a rise in import to GDP ratio during 1990s.

3.2 The Import Sector

In order to undertake investment projects, expand production and ensure the availability of consumer goods, Ethiopia has to import those goods that are not domestically produced or whose substitutes are not domestically available.

3.2.1 The Structure of Imports

The structure of Ethiopian imports, like exports, has remained rigid as the production and absorptive capacity of the economy failed to show any significant structural changes (NBE, 2000). Accordingly, the structure of import has been largely constituted by raw materials, semi-finished goods, capital goods and fuel, which are usually regarded as investment or development goods and mostly used in the industrial sector. Looking at the data between 1974/75 and 1999/2000, consumer goods constitute the largest share of imports until it was surpassed by the import of capital goods beginning from 1978/79 up to 1984/85 (Appendix 6). Import of consumer goods again took the leading share in 1984/85 and 1985/86 since the country was under severe drought at the time. After this period, capital goods dominated the total import of the country in most of the time registering the largest share of 47.1 percent of total imports in 1987/88. However, this share has declined to 29.2 percent in 1999/2000 as fuel and miscellaneous imports increased significantly in this year.

The importation of capital goods, raw materials, and finished goods in total imports accounted for 41.4 percent of total imports in 1974/75 and grew slightly to 43.1 percent in 1999/2000. During the whole Derg period and even after, the share of these items in total imports averaged about 50 percent. This clearly reveals the limited capacity of the country to produce these basic producer goods and substitute them by locally manufactured goods (see also Alemayehu, 1999). Hence, the structure of the economy in general and that of imports in particular has made imports downward inflexible.

3.2.2 The Origin of Imports

Like the case of the destination of exports, the origin of the country's imports has also remained to be limited to few developed countries (See Tables 3.4 and 3.5). This is actually obvious since its imports are basic investment goods that can be produced only at higher capacity, which is conspicuous by its absence in many LDCs. The major providers of imports in to the country thus are Europe, Asia and America.

Table 3.5:Percentage Shares of Imports by Continent and Selected Countries

	1961*	1965	1970	1975	1980	1985	1990	1995	1999
Africa	2.5	1.3	3.1	2.2	2.0	1.4	3.6	6.6	7.1
Djibouti	0.1	0.1	0.2	0.1	0.8	0.2	1.3	2.5	1.9
Egypt	0.2	0.0	0.3	0.0	0.0	0.0	0.2	0.5	1.4
Kenya	0.5	0.3	1.5	1.4	1.0	0.4	1.8	3.1	1.2
Europe	53.8	58.4	57.2	47.6	66.2	64.3	68.0	43.1	42.4
Belgium	1.8	-	-	-	0.6	1.0	1.9	3.1	2.0
France	1.8	4.9	2.9	3.5	2.2	3.3	2.9	2.8	3.9
Germany	9.8	10.7	14.1	9.9	11.8	11.4	10.7	7.7	6.8
Italy	15.7	18.1	17.4	10.9	10.8	8.0	16.5	12.3	8.1
Dutch	3.3	0.0	0.0	0.0	2.3	2.8	2.8	2.8	2.7
UK	9.4	9.2	7.7	7.7	6.6	8.7	7.6	5.9	5.8
America	9.8	11.8	8.7	7.4	8.4	19.5	6.5	13.4	6.8
Canada	-	-	-	-	0.3	3.2	0.9	0.7	0.2
US	9.7	11.8	8.7	7.4	7.7	16.1	5.4	12.9	6.0
Asia	35.5	28.5	31.0	42.7	21.0	12.7	15.1	34.4	42.8
Japan	15.2	15.2	1.5	11.9	8.7	6.0	6.5	8.4	7.5
Saudi Arabia	7.8	0.9	0.2	12.1	0.1	0.9	1.6	11.8	4.0

*End of June.

Source: Computed from the NBE Quarterly Bulletin, Various Issues.

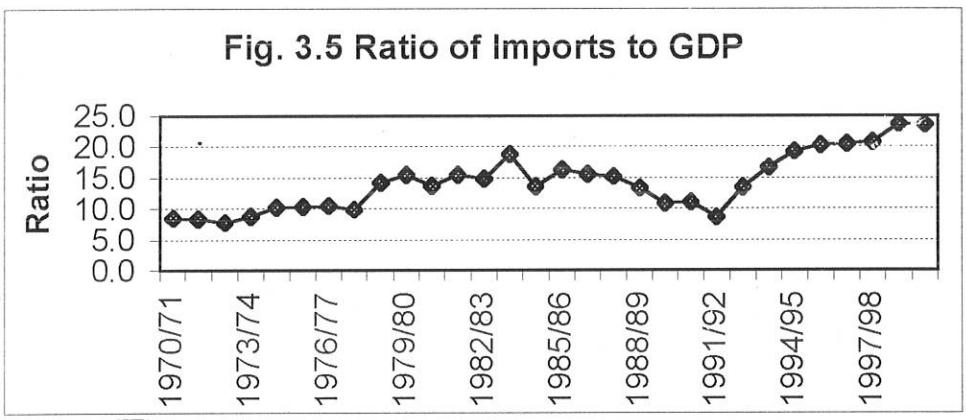
Europe has been the leading supplier although its share has declined over time. Its share was 53.8 percent in 1961 but declined to 42.4 percent in 1999 (Table 3.5). Of European counties, Germany, Italy, France and UK are the major exporters to Ethiopia accounting for 58.1 percent of European share and 26.6 percent of total imports at the end of 1999. The second largest markets have been the Asian markets, which have recently shown an increasing trend. Japan and Saudi Arabia have been the largest markets in Asia.

While the American markets (principally USA) ranked third, Africa accounts little share. Since African counties produce primary commodities, trade between Ethiopia and other African countries has been limited. Djibouti and Kenya have been the major partners of Ethiopian in terms of imports from Africa.

3.2.3 Performance of Imports

When we look at the developments in the import sector, it showed an increasing trend over time. For instance, imports as a proportion of GDP steadily increased from an average of 10.4 percent in the 1970s to 14.8 percent in 1980s and reached 16.2 percent in 1990s (Appendix 5 and Fig 3.5). The rising of imports is inherent in the industrial strategy of the country. During the Imperial regime, even if import substitution strategy was adopted lately, its implementation had faced a set back by the small level of savings and investment possibilities, the result of which was slow progress in industrial sector (Bulti, 1992). The Derg regime also made a strong effort to implement an import substitution strategy that intended to curtail imports. However, due to the misguided policy adopted by the Regime in the industrial sector, imports continued to rise except in the late 1980s. During the period, all industries

were nationalized and became state properties. As a result, the choice and development of the industry was not guided by the profit maximization motive. Associated with the increased civil war, the import of weapons was also significant during the Derg period. Consequently, "during the 1980s the country was counted to be among the top 15 developing country importers of weapons" (McNamara, 1991 referred in Naude, 1998:131). However, during the eve of the current reform program, imports were declining and recorded 8.7 percent of GDP 1991/92. Such lowest record in imports was mainly due to a severe foreign exchange shortage and various prohibitive measures (Tarekegn and Mulu, 2000). The country's international reserves covered less than three weeks of imports at that time.



Even after the substantial devaluation of the national currency in 1992, imports showed no sign of decreasing despite the objective of devaluation (Fig. 3.5). Immediately after the reform program, imports started rising and increased significantly afterwards registering the highest figure of 23.8 percent of GDP in 1998/99.

Similarly, imports averaged USD 360.7 million in the 1970s, 931.1 million in the 1980s and USD 1149.1 million in the 1990s. Specifically, during the Derg regime imports recorded an

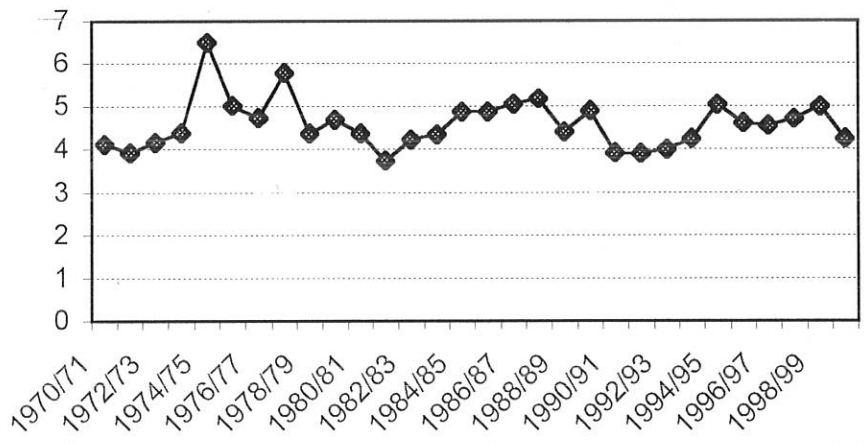
average of USD 772.9 million. This was surged up to USD 1198.4 million after 1992/93. The main reasons for the resurgence of imports after 1992/93 was the trade liberalization measures such as devaluation, ease of foreign exchange control, the rationalization of tariffs and the removal of quantitative restrictions that have been adopted by the current government.

3.3 Terms of Trade

One of the ways in which foreign trade contributes to economic growth is through terms of trade effect. Developing countries like Ethiopia are, however, dissatisfied with their participation in the international trade due to unfavorable terms of trade they are facing. This has been inherent in the nature of primary commodities they export that fetch lower prices vis-à-vis manufactured goods.

Looking at the data between 1970/71 and 1999/2000 for Ethiopia, one can clearly observe that the country's external terms of trade have shown marked fluctuations but generally deterioration that supports the Prebish-Singer hypothesis (Fig. 3.6).

Fig. 3.6 Trends in Log of the Terms of Trade



The deterioration is particularly acute beginning from 1974/75 and reached the lowest record in 1981/82. The downward trend in terms of trade is attributable to both the decline in the export prices and the rise in the import prices. In particular, the deterioration is closely linked with fluctuations in the prices of coffee.

3.4 Ethiopia's External Trade Policy

During the Imperial regime, the country had adopted relatively market based trade policy. At the early stage, export promotion had been the main strategy. In this case, the government had the objective of achieving a better export quality. This could be evidenced by the establishment of various institutions that dealt with quality control of export commodities (AACC, 1967). These include the National Coffee Board of Ethiopia, the Grain Board and the National Meat Board that had been set up to control the quality of coffee, cereals (including pulses and oilseeds) and meat products, respectively. During this period, there had been no restrictions except exchange control, on virtually all export commodities other than live animals and the products derived from them. Despite such efforts, according to the survey conducted on the major importers of Ethiopian commodities by Schwarz (1969), the major problem of exports under the Imperial regime were the lack of quality grades and standards, including packing and shipment problems.

Latter, however, import substitution strategy was adopted. Consequently, capital goods and raw materials were imported free of duty but other imports were taxed (MIT 1987, in Alemayehu 1999).

The "free" trade policy was abandoned as the country moved towards a command economy in mid 1970s. Again, import substitution was pursued as the main trade strategy. Hence, the import of some items was discouraged. For instance, foreign exchange was not allocated for alcoholic beverages and other consumer goods considered as "non-essential" or which had substitutes locally (Alem, 1996). Furthermore, only such items as pharmaceuticals, fuel, raw materials, and intermediate inputs were allowed to be imported through suppliers' credit. Taxes on exports were also high at the time. Recognizing the problems associated with the central planning, the government in 1988/89 had made a moderate shift by launching its so-called mixed economic policy. As a result, some restrictions on the external trade were removed. However, these policy changes were seen as "too little too late" (Naude, 1998), and the current government instead has adopted a market based economic policy.

A sort of export promotion together with import substitution is the main trade strategy pursued currently. Different measures that enable to implement this strategy have been adopted since 1992. Despite a wide range of policy reforms adopted since then, the export sector has not shown improvements as much as expected. The scarcity of agricultural land to expand traditional exports, lack of access to urban land due to the overall land policy, lack of access to domestic sources of export finance, the erratic nature of international prices for primary commodities, low income and price elasticity of exports for primary goods, are among the major factors that hampered the expansion of exports.

Imports haven't also dwindled despite strong desire to reduce them through adopting devaluation and enhancing domestic production. This emanated from the fact that there are

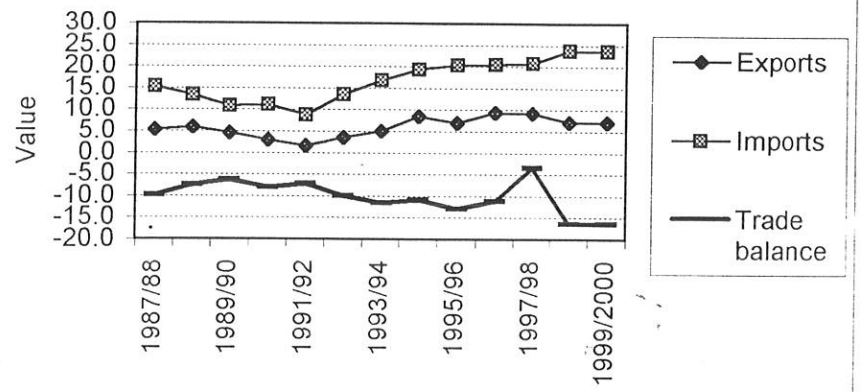
no domestic substitutes for most of goods imported. The industrial strategy of the country has given little attention to the expansion and development of domestic substitutes for imports as the development policy, instead, has given top priority to the agricultural sector, which is under the mercy of rainfall.

3.5 Trade Liberalization and Ethiopia's Balance of Payments

Given the situation that the imports of the country are basic investment goods, it is unavoidable that imports significantly affect the trade balance of the country and subsequently the overall balance of payments. This coupled with the slow growth in exports, which are in effect primary commodities, results in a further deterioration of the country's trade balance.

Taking data between 1987/88 and 1999/2000, it is observed that the trade balance was in deficit through out the entire period (Fig. 3.7). It showed relatively a constant growth until 1991/92.

Fig. 3.7 Ratio of Imports, Exports and Trade Balance to GDP (1987/88 - 1999/2000)



However, despite relative growth in exports, the trade balance started to deteriorate after 1992/93 owing to a substantial growth in imports. The deterioration in trade balance clearly hampers the stability in the balance of payments. However, the Ethiopian balance of payments showed a relative positive trend in 1993/94 and 1994/95 (Table 3.6). This was due to the improvement in current and capital accounts, which in turn improved because of the respective huge inflow of official transfers, and net long-term capital in the form of aid or borrowing associated with Structural Adjustment Program. On the other hand, the balance of payments started to deteriorate beginning 1995/96 mainly due to the widening gap in the current account deficit.

Table 3.6: Developments in Balance of Payments (1992/93 - 1999/00) **(Millions of Birr)**

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Trade balance	-2669.0	-3120.6	-3814.7	-4946.4	-4622.6	-5196.7	-8067.0	-9158.8
Current Account	-1647.1	-1513.1	-1463.5	109.1	-833.1	-506.1	-3683.8	-2749.1
Public transfers	1708.7	1447.7	2560.2	2474.2	1453.0	1793.0	1725.8	1233.5
Capital Account	-45.4	1233.2	186.6	220.1	-719.1	633.3	1598.9	2368.3
Errors & Omissions	-515.4	-527.0	-83.1	-700.3	-210.5	-827.4	1213.5	-1463.6
Overall balance	-499.2	640.8	1200.2	-371.1	-1762.7	-700.2	-744.6	-2977.0

Source: National Bank of Ethiopia

The growth of Ethiopia's trade and current account deficits was attributed to the trade liberalization measures such as devaluation. This is because the responsiveness of exports and imports to devaluation is slow.

It is generally agreed among economists that trade liberalization should be carried out gradually and in a managed way. This is because managed and gradual liberalization provides better opportunity and incentive for firms to build up capacities that can cope up with a more competitive environment (Lall and Wangwe, 1998). Furthermore, credibility and commitment is essential to undertake and sustain trade liberalization in general (Rodrik, 1998).

However, there are wide controversies over trade liberalization. It is not clear to what extent a country must open up if it desires to realize a fast growth and at what level of development would a given degree of openness yields the intended result in terms of export growth and economic performance (Oyejide, 2000). There are also factors that limit the extent of trade liberalization in LDCs. These include the use of import protection as a means of establishing an industrial base and revenue generation (Oyejide, 2000: 5). Furthermore, macroeconomic imbalances such as high inflation, unemployment, and balance of payments deficits have resulted in the reversal of trade reforms in many LDCs.

CHAPTER FOUR: THE DATA AND METHODOLOGY

Given the objective of estimating aggregate import and export and their components demand functions that enable us to know the determinants of international trade flows of the country, the methodology employed in the study including model specification and the econometric approach is discussed in this chapter. Furthermore, the description of the data and its characteristics will be analysed.

4.1 The Data: Sources, Definitions and Transformations

Before directly undertaking the estimation of our model, it is important to highlight the sources, the definitions as well as the transformations of the data used in the study. To begin with, the major sources of the data for the analysis are Customs Authority, the National Bank of Ethiopia (NBE), Ministry of Industry and Trade (MIT), Ministry of Economic Development (MEDaC), Central Statistical Authority (CSA), Development Bank of Ethiopia (DBE), publications of the IMF particularly (IFS) and its Data Base.

i) Generation of Quarterly GDP[14]

For the current study quarterly data for GDP[15] are generated, as these figures are not available for the country. Yohannes (2000) tried to disaggregate annual GDP in to quarterly figures

[14] I thank Haile Kibret and Equar Desta of this batch whose collaborative effort with me was important in the generation of seasonality coefficients for the GDP breakdown in to quarterly series.

[15] The "old" series and the "new" revised series of GDP components are made consistent using the growth rates of the "old" series and the 1980/81 (new base year) value as:

$X_{t-1} = X_t / (1+g_t)$, where X_t is a given series in year t, g_t is the growth rate of the variable.

based on a technique used by Ichero Otani as used by Ibrahim and Teklewold (1991). He used stock GDP data.

For the current paper, however, the generated quarterly GDP is employed in flow concept. According to Bahmani-Oskooee (1987:123), the obtained quarterly data for GDP need be adjusted in such a way that QI + QII + QIII + QIV = annual GDP. Based on this, since the country's production, particularly that of agriculture, is highly susceptible to seasonal variations, quarterly adjustments is made on the basis of certain coefficients. Accordingly, attempts were made to study the behavior of agriculture. Such organizations as Ministry of Agriculture, Central Statistical Authority, DBE and MEDaC were visited.

It is identified that about 95 percent of agricultural production comes from the main season. Furthermore, the largest share of agriculture is that of cereals. The disaggregration of agricultural output then rests up on the coefficients obtained on the basis of labour requirements in agriculture. That is, the man-days for each agricultural operation (plaughing, weeding, harvesting, etc) for major cereal crops are used to obtain the coefficients after carefully categorizing the activities in their respective quarters. For the industrial sector, data on the largest 28 public enterprises are available on quarterly basis from 1993/94 up to 1999/2000 (MEDaC). These are used to obtain coefficients that help for the disaggregation of industrial GDP. Regarding the service sector, the disaggregation is based on the quarterly loan disbursements of the banking system to the distributive services[16]. The "Other services"

[16] According to the MEDaC's classification, Distributive Services include trade, hotels and restaurants, transport and communications. The "Other Services" comprise banking, insurance, and real estate, public administration and defense, education, health, and domestic and other services.

section of MEDaC classification is distributed equally for each quarter. The disaggregated figures for each sector are then summed together to give quarterly GDP. GDP for each quarter is then added to give annual GDP (For detailed disaggregation see Appendix 7). This approach, though plausible in accounting for the seasonality, it is based on constant coefficients, does not include private sector enterprises in the case of industry and that the "other services" are assumed to be less subject to seasonal variations.

ii) Import and Export Unit Value Indices

Import and export unit value indices are constructed using the Laspeyre's method (LP), Paasche method (PP) and the Fisher's formula. These are given as follows (Gupta 1981:400):

$$LP = \frac{\sum P_n Q_O}{\sum P_O Q_O} X100$$

$$PP = \frac{\sum P_n Q_n}{\sum P_O Q_n} X100$$

$$FISHER'S = \sqrt{LP.PP}.100,$$

where P_n = the current unit value, P_o = base year unit value

Q_n = current quantity, Q_o = base year quantity

The Laspeyer's formula uses the base year as weights whereas the Paache formula uses the current year quantities as weights. The Laspeyer's formula fails to capture the current fluctuations in prices. The Paache formula is less useful for the purpose of comparison as it is based on the current weights. The Fisher's formula is simply the geometric mean of

Laspeyer's and Paache formulas. For the purpose of this paper, Fisher's formula is preferred as it helps to correct the deficiencies in the other two methods.

iii) Weighted GDP of Trading Partners

The activity variable (RGDPX) used in the export demand equation is calculated as the weighted average real GDP of trading partners less their exports. The weights are given by the share of the country's exports to each of its trading partners[17] (see also Senhadji and Montenegro, 1998):

$$RGDPX = \sum_{i=1}^{6} \omega^i GDP^i \quad and \quad \omega_t^i = x_t^i / \sum_{i=1}^{6} x_t^i$$

Where GDP^i is real GDP of trading partner and x^i is nominal exports of the country to its trading partner. The trading partners are chosen on the basis of their being major partners and the availability of data, particularly data on quarterly GDP of the same.

iv) Selection of Component Imports and Exports

As mentioned at the outset, the estimation of both the aggregate and component import and export demand functions will be carried out in this paper. The component imports to be estimated include fuel and machinery. In the estimation of the demand for component imports, the imports of fuel and machinery are chosen on the grounds that they constitute the

[17] The major trading partners used here include France, Italy, Germany, Japan, United States and United Kingdom.

bulk of the country's imports. The other reason for considering two components is that the estimation of many equations in the Johansen framework is relatively involving.

The demand for real imports of fuel (LRFUEL) is then defined as the function of its relative price (LRPFU) and other variables to be discussed under aggregate imports (LRGDP, LRFERT and LRINT-1). Likewise, the import of machinery (LMAC) is the function of LRPM (its relative price) and other variables. The same argument is applied to choose the export components for the estimation. Hence, we select coffee (LCOF) and hides and skins (LHIDSK) to be estimated and define them as the functions of their relative prices (LRPCOF for coffee and LRPHIDSK for hides and skins) and the weighted GDP of trading partners.

4.2 Methodology

4.2.1 Model Specification

In this sub section the specification of import and export demand functions used in the study is conducted.

4.2.1.1 Import Demand Functions

The theoretical foundation of the import demand model used in this study is based on the one developed by Hemphill (1974) and later modified by Moran (1989). The model starts by assuming that the volume of imports is determined by an explicit

optimization problem. That is, the authorities have the objective of minimizing the costs of deviating from the actual and desired levels of both imports and international reserves, which is represented by quadratic cost function as (see Hemphill (1974: 651) and Moran (1989:281)):

$$C_t = \alpha_1(M_t - M_t^*)^2 + \alpha_2 (R_t - R_t^*)^2 + \alpha_3 (M_t - M_{t-1})^2 + \alpha_4 (M_t - M_t^d)^2 \text{---(1)}$$

Where M_t = the actual volume of imports at time t;

M_t^* = the long run import volume

R_t = the current real international reserves

R_t^* = the long-run level of real international reserves.

M_t^d = short-run desired level of import volumes

C_t = cost of deviation from actual and desired level of both imports and international reserves, and, the αs are all expected to be positive. Since we are interested in the determinants of real imports, we deflate all variables by import prices.

It is expected that in a steady state, the actual and desired levels of imports will be equal and will both equal the long-run level of foreign exchange receipts (F*). In the short-run, however, the actual and desired volume of imports may not be equal due to existence of past or current shocks.

From theory, it is suggested that economic decision-makers wish to minimize the cost of deviations from the long-run equilibrium level of imports. It is also argued that reserves are held essentially to finance the gap between imports and foreign exchange

receipts. In this regard, external reserves are held basically to smooth out the volume of imports over time. It is further assumed that the long-run level of international reserves is positively related to the long-run import level, which is represented as follows:

$$R_t^* = \beta o + \beta_1 M_t^*, \; 0 \leq \beta_1 \leq 1 \text{ ----------(2)}$$

In the short-run, however, both variables are related through the balance of payments identity;

$$\Delta R_t = F_t - M_t \text{ ----------(3)}$$

Where F_t stands for current level of (real) foreign exchange receipts.

An explicit assumption is also made about the long-run level of foreign exchange receipts, F_t^*. According to Moran (1989), it is expressed as:

$$F_t^* = F_t + \lambda \Delta F_t \text{ ----------(4)}$$

Where λ represents the way in which changes in foreign exchange are perceived by the authorities. A positive value of λ corresponds with the perception that the authorities see changes in foreign exchange earnings as permanent; but if λ is negative changes are perceived to be transitory. Empirically, however, λ could not be properly

identified, and following Moran (1989), the current level of foreign exchange earnings is equated with the long-run receipts, implying that $\lambda=0$.

An economic theory states that the quantity of imports demanded by a country depends on the relative prices (the ratio of import prices to domestic prices) and the level of real income in that country. This is the traditional import demand model, which relates imports to relative prices and real income. This could be expressed as follows:

$$M_t^d = a_0 + a_1 (P_m/P)_t + a_2 Y_t \text{ ----------(5)}$$

Where M_t^d is demand for real imports; P_m is import prices; P_t is an aggregate price index of domestic goods; Y_t is real income (real GDP).

This specification has a micro-foundation since it is based on the consumer demand theory, which states that the consumer has the objective of maximizing satisfaction and hence income is allocated among competing goods. This argument can be extended to the demand for imports, that is, demand for imports by a consumer is affected by income, import prices themselves and prices of other commodities (domestic goods). Adding the individual demand for imports one can obtain the aggregate imports for the economy as specified under (5) (Egwaikhide, 1999).

Moran (1989) derived another import demand function by substituting equation (2) and (5) in to equation (1) and minimizing the resulting equation subject to the foreign exchange constraint (equation 3) and recalling that $M_t^* = F_t^* = F_t$.

The derived import demand function is:

$$M_t = b_o + b_1 F_t + b_2 R_{t-1} + b_3 M_{t-1} + b_4 (P_m/P)_t + b_5 Y_t \text{----------(6)}$$

and $b_1 \geq 0; b_2 \geq 0; b_3 \leq 1; b_4 \leq 0; b_5 \geq 0.$

This is the general import equation estimated by Moran (1989), of which the traditional, and Hemphill import models are special cases. Setting $b_1 = b_2 = 0$, we obtain the traditional import demand as follows:

$$M_t = a_0 + a_1 (P_m/P)_t + a_2 Y_t + a_3 M_{t-1} \text{ ----------(7)}$$

$$a_3 \leq 0; a_2 \geq 0; 0 \leq a_3 \leq 1$$

The Hemphill model which excludes relative prices and domestic income can also be obtained by making $b_4 = b_5 = 0$. That is,

$$M_t = b_o + b_1 F_t + b_2 R_{t-1} + b_3 M_{t-1} \text{ ----------(8)}$$

$$b_1 \geq 0; b_2 \geq 0; b_3 \leq 1$$

Equations 6 is estimated in log-linear form and the general import model for aggregate import is

$$\ln M_t = b_o + b_1 \ln F_t + b_2 \ln R_{t-1} + b_3 \ln M_{t-1} + b_4 \ln (P_m/P)_t + b_5 \ln Y_t \text{ ----------(9)}$$

The estimable aggregate import demand equation using the empirical variables can then be given in the form:

$$\ln RIMP_t = \beta_0 + \beta_1 \ln RGDP_t + \beta_2 \ln RP_t + \beta_3 \ln RIMP_{t-1} + \beta_4 \ln RINR_{t-1} + \beta_5 \ln RFERT_t \text{ ------(9)'}$$

where RIMP is real imports obtained by deflating the nominal imports by import unit value index, RGDP is real GDP, RP is relative price given as the ratio of import unit value index to consumer price index, $RIMP_{t-1}$ is lagged real imports, RINR and RFERT are lagged real international reserves and real foreign exchange receipts, respectively.

For individual import items, the functional form is:

$$\ln RIMP_{it} = \beta_0 + \beta_1 \ln RGDP_t + \beta_2 \ln RP_{it} + \beta_3 \ln RIMP_{it-1} + \beta_4 \ln RINR_{t-1} + \beta_5 \ln RFERT_t \text{ ---------(10)}$$

Equation (9) and (10) takes into account the effect of quantitative restrictions. When quantitative restrictions are ignored in an econometric estimate of import demand, it will imply a specification error and lead to biased and inconsistent estimates (Ogbu, 1994). Quantitative restrictions are difficult to model. Hence, it is often proxied by foreign exchange receipts and lagged international reserves (Hemphill, 1974, Moran, 1989, Ogbu, 1994)[18] as included in the general import model above. These are sometimes included into import

[18] Including foreign exchange receipts and reserves is, however, an indirect way of capturing quantitative restrictions. Alemayehu (1998) derived trade expenditure function for small open economy with tariff and quantitative restrictions.

demand function to indicate the capacity of a country to import. Lagged import is also included to capture the partial adjustment in imports.

4.2.1.2 Export demand function

The export demand model used in this paper is the one developed by Senhadji and Montenegro (1998). The model begins by assuming that the exporting country (the home country) has only one trading partner. In this case, the export demand of the home country (X_t) is identical to the import demand of trade partner (the foreign country). The model also assumes that the import decision of foreign country is made by an infinitely– lived representative agent that decides how much to consume from his domestic endowment (D^*_t) and from imported good (M^*_t). The optimization problem of the inter-temporal representative agent from the foreign country can be given as follows:

$$\underset{\{D_t^*, M_t^*\}_{t=0}^{\infty}}{Max}\ E_0 \sum_{t=0}^{\infty} (1+\delta)^{-1} u\ (D_t^*, M_t^*) \qquad \text{----------(1)}$$

Subject to:

$$B_{t+1}^* = (1+r)B_t^* + (e_t^* - D_t^*) - P_t^* M_t^* \qquad \text{----------(2)}$$

$$e_t^* = (1-\rho)\bar{e}^* + \rho e_{t-1}^* + \xi^*_t, \qquad \xi^*_t \sim (0, \sigma^2) \qquad \text{----------(3)}$$

$$\lim_{T\to\infty} \frac{B_{T+1}^*}{\prod_{t=0}^{T} (1+r)^{-1}} = 0 \qquad \text{----------(4)}$$

Where δ is the subjective discount rate of the consumer; r is the world rate of interest; B^*_{t+1} is the next period stock of bonds held by the foreign country if positive and stock of foreign bonds held by the home country if negative, e^*_t is the stochastic endowment which have an AR (1) process with respective unconditional mean and unconditional variance of $\bar{e}^*$ and $\sigma^2/(1-\rho^2)$, σ^2 being variance of the iid innovation ξ^*_t, and ρ determines the degree of persistence of endowment shock, and P_t is the price of home good in terms of the foreign good. From above, equation 2 represents the current account equation, 3 the stochastic process deriving the endowment shocks, and 4 transversality condition (Senhadji and Montenegro, 1998: 6). The first order conditions are then:

$$u_t^{D^*} = \lambda_t \text{ ----------(5)}$$

$$u_t^{M^*} = \lambda_t p_t \text{----------(6)}$$

$$\lambda_t = (1+\delta)^{-1}(1+r)\,E_t\,\lambda_{t+1} \text{----------(7)}$$

Where λ_t is the Lagrange multiplier on the current account equation (2) and from (5), λ_t represents the marginal utility of the foreign consumer for the domestic good.

They also assumed that the utility function u is addilog. That is,

$$u(D_t^*, M_t^*) = A_t (D_t^*)^{1-\alpha}(1-\alpha)^{-1} + C_t^* (M_t^*)^{1-\beta}(1-\beta)^{-1} \quad \alpha>0, \beta>0 \text{ ----(8)}$$

$$A_t = e^{a_0 + E_{A,t}} \text{----------(9)}$$

$$C_t = e^{c_0 + E_{C,t}} \text{----------(10)}$$

Where A_t and C_t represent exponential stationary random shocks to preference with $E_{A,t}$ and $E_{C,t}$ being stationary shocks, and α and β parameters. Deriving the first order conditions from (8) and substituting into (5) and (6) gives

$$D_t^* = \lambda_t^{-1/\alpha} A_t^{1/\alpha} \text{ ----------(11)}$$

$$M_t^* = \lambda_t^{-1/\beta} C_t^{1/\beta} P_t^{1/\beta} \text{ ----------(12)}$$

Up on substituting equations (9)-(11) in to equation (12) and taking logarithm in both sides yields:

$$\text{Log}(M_t^*) = \log(X_t) = b_o - 1/\beta \log(P_t) + \alpha/\beta \log(D_t^*) + \in_t \text{ ----------(13)}$$

Where: $b_o = 1/\beta(c_0 - a_0)$ and $\in_t = (1/\beta)(\in_{C,t} - \in_{A,t})$.

In the Model, the exports of foreign country is given as $X_t^* = GDP_t^* - D^*_t$. From here, $D^*_t = GDP_t^* - X_t^*$. Thus, the model gives an equation for the export demand for the home country (X_t) which is near to the traditional export demand function with the exception that the correct activity variable is now GDP_t minus exports of foreign country ($GDP^*_t - X^*_t$) unlike GDP_t in the standard case. Therefore, substituting $D_t^* = GDP^*_t - X^*_t = gdpx^*_t$ in to equation (4) gives an aggregate export function of:

$$\ln(X_t) = b_o - 1/\beta \ln P_t + \alpha/\beta \ln(gdpx^*_t) + \in_t \text{ ----------(14)}$$

Like the case of imports we then express aggregate export demand function to be estimated in log-linear form as:

$$\ln REXP_t = \alpha_0 + \alpha_1 \ln RPX_t + \alpha_2 \ln RGDPX_t \text{ ----------(14')}$$

The estimated equation for individual export is:

$$\ln REXP_{it} = \alpha_0 + \alpha_1 \ln RPX_{it} + \alpha_2 \ln RGDPX_t \text{ ----------(15)}$$

In the equation, REXP is real exports given as export value deflated by export unit value index, RPX is relative price i.e. the ratio of export unit value of the country to the world export unit value, RGDPX is the weighted real GDP of trading partners less their exports.

4.2.2 Econometric Methodology

In dealing with time series data it is common practice to test the hypothesis that the process generating a series has a unit autoregressive root versus that this process is stationary (Leybourne and Newbold, 1999). If the variables in a regression are established to be stationary, it means that the assumptions of the classical regression model hold. When non-stationary[19] variables are used in regression, they result in "spurious" regression. This means that a model may show a promising diagnostic test statistics even in the case where there is no meaningful result in the regression analysis (Charemza and Deadman, 1992). Specifically, a "spurious" regression that arises from non-stationary variables has R^2 and t-statistics that appear to be significant but the results are with out any economic sense (Enders, 1995).

Most macroeconomic variables are found to be non-stationary and show trending over time (Johansen, 1992). One can, however, difference or detrend the variables in order to make them stationary. If variables become stationary through differencing, they are in the class of difference stationary process. On the other hand, if they are detrended, they are trend stationary.

[19] In non-stationary time series shocks are necessarily permanent; and that its mean /or variable are time-dependent (Enders ,1995).

The current paper employs the commonly used Dickey-Fuller (DF) and Adjusted Dickey-Fuller (ADF) tests to detect the presence of unit roots in the data. Both the DF and the ADF tests are based on the null hypothesis that a unit root exists in the variables against the alternative that the variables are stationary.

To illustrate the two tests, consider an equation of the form:

$$Y_t = Y_{t-1} + \xi_t.$$

The DF test is based on the regression equations $\Delta y_t = \alpha y_{t-1} + \xi_t$, $\Delta y_t = a_0 + \alpha y_{t-1} + \xi_t$ and $\Delta y_t = a_0 + \alpha y_{t-1} + a_2 t + \xi_t$. The first is a pure random walk model, the second adds a drift and the third includes both a drift and a time trend. The ADF test is also based on these equations except it is augmented by the series of lags. The augmentation is required to tackle the possible autocorrelation problem. For instance, when both the intercept and a linear time trend is included and the augmentation is up to p lags, the ADF has the form:

$$\Delta y_t = a_0 + \alpha y_{t-1} + a_2 t + \sum_{i=2}^{p} \beta_i \Delta y_{t-i+1} + \xi_t$$

The unit root test requires that the null hypothesis $\alpha = 0$ (there is a unit root) versus $\alpha < 0$ (the series is stationary). Here the usual t-test cannot be relied up on (see Thomas, 1993, Enders, 1995).

In the case where the variables are difference stationary, it is possible to estimate the model by first difference. However, this gives only the short run dynamics in which case valuable information concerning the long run equilibrium properties of the data could be lost (Kennedy, 1992). In order to obtain both the short run dynamics and the long run

relationships, one can appeal to what is known as cointegration. The concept of cointegration implies that even if many economic variables are non-stationary, there linear combination may be stationary (Cuthberston, et al, 1992).

In testing for the existence of cointegration in time series data, the two widely employed methods are the Engle-Granger two-stage procedure and the Johansen maximum likelihood approach. However, the Johansen procedure has been far superior to the residual-based Engle-Granger two-step approach[20] in testing for cointegration in many ways (Masih and Masih, 2000). First, unlike the Engle-Granger procedure, it does not make a priori assumption about the existence of at most a single cointegrating vector; rather it explicitly tests for the existence of multiple cointegrating vectors. Second, it avoids the arbitrary selection of the dependent variable as opposed to its predecessor, and is not sensitive to the variable being normalized. Third, it is set up on a unified framework for estimating and testing cointegration relationships on the basis of the Vector Error Correction Mechanism (VECM) approach. In other words, such multivariate cointegration approach is based on a fully specified statistical model that increases the efficiency of the estimation (Juselius, 1992). Fourth, it rests up on appropriate statistics for hypotheses testing for the number of cointegrating vectors and tests of restrictions up on the coefficients of the vectors. Specifically, the inference about the estimated coefficients depends up on unreliable (biased) parameters in the case of Engle-Granger approach and that the unit root test applied to the error term to test its stationarity has less power compared to Johansen's test (Ericsson, 1994).

In this regard, the current paper employs the Johansen maximum likelihood procedure in testing for cointegration, as it possesses the aforementioned advantages over the Engle-Granger methodology. The Johansen approach is given as follows representing our variables by a vector of X_t and our model as an unrestricted vector autoregression (VAR) with k lags (Johansen, 1995:10, 45):

$$X_t = \Pi_1 X_{t-1} + \Pi_1 X_{t-2} + \ldots + \Pi_k X_{t-k} + \Phi D_t + V_t,$$

Where X_t is an (m x 1) matrix of variables, Π_i is an (m x m) matrix of parameters, and V_t is independent identically distributed error terms with mean of zero vector 0 and vector of variances Ω, i.e. Vt ~N (0, Ω). The deterministic terms D_t represent a vector of a constant, various dummies and other regressors that are fixed and non-stochastic.

The above system can be reparametrized in error correction form as (see Hansen and Johansen, 1999),

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \ldots + \Gamma_{k-1} \Delta X_{t-k+1} + \Phi D_t + \Pi X_{t-k} + V_t$$

Here, the estimates of Γ_i define the short run adjustment while those of Π represent long run information. If the rank r of Π is zero, no stationary linear combination can be identified and hence the variables in X_t are not cointegrated. If Π has full rank, the variables are stationary in levels. The interesting case is, however, where Π has reduced rank, that is, r is less than the

[20] In testing for cointegration in Engle-Granger approach, the first step is to estimate the long run model and obtain the resulting residuals and the second step involves testing for the stationarity of the residuals. If indeed the residual is stationary the series is cointegrated (See Enders, 1995: 374).

number of variables in the regression. In this case, Π may be decomposed in to two matrices α and β, such that $\Pi = \alpha \beta'$, with each matrix (n x r) (Johansen, 1995). In this regard, β represents the coefficients of r distinct cointegrating vectors that makes $\beta' X_t$ stationary, even if X_t is nonstationary, and the α-matrix constitutes the speed of adjustment coefficients.

In the Johansen procedure there are two tests that help to identify the number of cointegrating vectors, called the trace (λ_{trace}) and the maximal (λ_{max}) statistics. These tests are given as follows (Johansen, 1995, Harris, 1995):

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} \ln(1 - \hat{\lambda}_i)$$

$$\lambda_{max}(r, r+1) = -T \ln(1-\lambda_{r+1})$$

where λ_i = eigenvectors, T = number of observations.

The trace statistics is used to determine whether there is at most r cointegrating relationships while the maximal statistics tests the null hypothesis of r cointegrating vectors against the alternative of r+1.

CHAPTER FIVE: ANALYSIS OF EMPIRICAL RESULTS

5.1 Time-series Properties of the Data

5.1.1 Tests for Stationarity

Since time series data are employed in the current study, it is mandatory, as the first step, to test for the stationarity of the variables. This is because our model may contain non-stationary variables that would lead to a problem of "spurious" regression.

Testing for unit roots is a necessary condition prior to testing for cointegration. The unit root test will then be conducted to know the order of integration of the variables used in the regression. Based on the DF and ADF tests already discussed, most of the variables entering the regression of aggregate import, except relative price, and export demand equations are found to be integrated of order one [I(1)][21]. Similarly, the variables in the component imports and exports excluding coffee export are stationary in their first difference (see Table 5.1). These outcomes are not surprising, as most macroeconomic variables are difference stationary processes (Nelson and Plosser (1982), quoted in Masih and Masih, 2000). However, the Johansen procedure also allows series that are integrated of mixed orders up to I(1), that is, both data that are

[21] A variable is said to be integrated of order d, i.e. I(d), if it must be differenced d times to become stationary (Kennedy 1999: 253).

stationary in levels [I(0)] and stationary in first differences [I(1)] can be entered together for tests of cointegration (see Harris, 1995, Masih and Masih, 2000).

Table 5.1: DF and ADF Tests for Unit Roots

Variable**	DF*			ADF*					
				Lag 1			Lag 2		
	A	B	C	A	B	C	A	B	C
Aggregate Import									
LRIMP	-0.31	-3.46	-4.62	-0.11	-3.03	-4.22	0.25	-2.19	-3.27
LRGDP	0.24	-4.40	-8.83	0.25	-4.73	-15.52	1.99	-0.23	-2.80
LRP	-6.54	-6.91	-7.27	-5.23	-5.60	-5.88	-4.44	-4.81	-4.96
LRFERT	-0.64	-4.04	-4.89	-0.43	-3.66	-4.59	-0.15	-3.02	-3.98
LRINR-1	-0.77	-2.37	-2.60	-0.57	-1.94	-2.19	-0.38	-1.57	-1.83
ΔLRIMP	-11.75	-11.81	-11.75	-9.83	-9.98	-9.93	-8.50	-8.76	-8.71
ΔLRGDP	-10.27	-10.22	-10.17	-38.21	-38.73	-38.67	-18.87	-20.83	-21.17
ΔLRP	-12.91	-12.98	-12.91	-8.06	-6.67	-8.10	-6.55	-6.67	-6.63
ΔLRFERT	-12.08	-12.10	-12.04	-8.71	-8.77	-8.73	-7.99	-8.11	-8.08
ΔLRINR-1	-10.15	-10.10	-10.05	-7.24	-7.21	-7.17	-5.64	-5.61	-10.05
Individual Import									
LFUEL	-0.96	-5.23	-6.76	-0.62	-4.05	-5.60	-0.17	-2.44	-3.79
LRPFU	-3.42	-8.27	-9.27	-2.55	-7.54	-9.29	-2.55	-5.48	-7.28
ΔLFUEL	-13.81	-13.75	-13.68	-12.79	-12.74	-11.23	-11.97	-11.94	-11.96
ΔLRPFU	-14.54	-14.48	-14.44	-11.29	-11.25	-12.70	-10.08	-10.06	-10.05
LMACH	-0.69	-10.65	-10.83	-0.09	-3.18	-3.28	-0.13	-3.79	-3.92
LRPM	-4.38	-15.09	-15.16	-1.55	-6.33	-6.39	-1.32	-6.38	-6.46
ΔLMACH	-34.16	-33.99	-33.83	-8.52	-8.47	-11.91	-12.01	-11.95	-11.91
ΔLRPM	-27.79	-27.65	-27.51	-10.93	-10.88	-10.82	-27.79	-16.76	-16.69
Aggregate Export									
LREXP	-1.83	-4.44	-6.00	-1.57	-3.06	-4.14	-1.52	-2.42	-3.22
LRGDPX	0.44	-3.93	-4.53	0.74	-3.25	-3.53	0.63	-3.32	-3.75
LRPX	-1.01	-3.14	-3.79	-1.03	-2.15	-2.19	-1.03	-1.74	-2.19
ΔLREXP	-15.50	-15.46	-15.39	-11.26	-11.26	-11.22	-10.68	-10.74	-10.71
ΔLRGDPX	14.20	-14.23	-14.27	-7.03	-7.03	-7.13	-5.59	-5.65	-5.72
ΔLRPX	-14.50	-14.46	-14.39	-10.02	-8.58	-9.97	-8.55	-8.58	-8.53
Individual Export									
LCOF	-5.56	-7.00	-8.40	-3.93	-5.16	-6.63	-2.66	-3.53	-4.85
LRPCOF	-2.22	-3.52	-3.74	-1.67	-2.24	-2.41	-1.56	-1.99	-2.15
ΔLCOF	-15.09	-15.01	-14.94	-12.56	-12.49	-12.44	-16.96	-16.88	-16.86
ΔLRPCOF	-15.58	-15.53	-15.46	-9.47	-9.46	-9.41	-7.98	-7.99	-7.95
LHIDSK	-3.10	-4.44	-6.93	-2.33	-3.37	-5.80	-1.46	-1.76	-3.52
LRPHIDSK	-1.45	-5.91	-8.57	-1.07	-4.00	-6.41	-0.94	-2.68	-4.66
ΔLHIDSK	-13.69	-13.63	-13.56	-14.23	-14.17	-14.12	-10.28	-10.25	-10.23
ΔLRPHIDSK	-15.74	-15.67	-15.59	-12.65	-12.60	-12.54	-10.23	-10.21	-10.16
Critical Values (1%)	-2.586	-3.496	-4.051	-2.586	-3.496	-4.051	-2.586	-3.496	-4.051
(5%)	-1.943	-2.89	-3.454	-1.943	-2.89	-3.454	-1.943	-2.89	-3.454

**A = without drift, B = with drift, C = with drift and trend.* **L indicates ln.

5.1.2 Cointegration Analysis

Once the order of integration of the variables is determined the next step is to test for the presence of cointegration. As already discussed, the Johansen maximum likelihood estimators circumvent the problems[22] associated with the Engle-Granger two-stage estimators.

A) Aggregate Imports

(i) Hypothesis Testing for Model Selection

Before dealing with the estimation of import demand function, hypothesis testing for model selection will be conducted using the Johansen procedure. As already discussed under model specification, we have three competing models for import demand. The first is that of Hemphill (1974) which defines imports as the function of current forex receipts and lagged international reserves. The other is the traditional import demand equation that most early empirical works relied on in analyzing import demand (import is the function of real income and relative prices). The third is the one estimated by Moran (1989) that combines the other two equations.

For testing which model is to be chosen, we first estimate the general import demand equation (9') under import demand function (See section 4.2.1.1). To test for Hemphill model we set β_1

[22] The three-step estimation procedure which constitutes a further regression of the conditioning variables from the static regression multiplied by minus the error correction coefficient, regressed on the errors from the second-stage error correction model is proposed to overcome these problems. However, this procedure is not superior to the maximum likelihood approach for unrestricted multivariate system (Cuthbertson, et al 1992).

$= \beta_2 = 0$ and for the traditional model $\beta_4 = \beta_5 = 0$ in equation (9'). The results of the tested hypothesis based on Johansen approach are given below.

Table 5.2 Tests for Model Selection

Hypotheses	LR-test	Result
$\beta_1 = \beta_2 = 0$	$\chi^2 = 14.26$ [0.0008]**	Hemphill model rejected
$\beta_4 = \beta_5 = 0$	$\chi^2 = 25.358$ [0.0000]**	Traditional model rejected

From Table 5.2, the null hypothesis that the coefficients of real income and relative price are zero at the same time so that the Hemphill model explains import demand is rejected. In the second case the traditional model is also rejected. This leads us to the conclusion that the general (eclectic) model is preferred in explaining import demand behaviour.

(ii) Estimation of Aggregate Imports

In the model, LRINR-1 is entered the cointegration restrictively since the monetary authority has no influence on it for a long period due to fixed exchange rate adopted for a long time. Hence, it is treated as an exogenous I(1) variable (See Garatt et al, 1999). The next step is to determine the number of cointegrating relationships in the variables entered the cointegration space. Accordingly, the results of the maximal and the trace tests for multiple cointegrating vectors are summarized in Table 5.3. As can be observed from the Table, the null hypothesis of no cointegration is rejected by both the λ_{max} and the λ_{trace} statistics. On the other hand,

while the trace statistics weakly rejected the existence one cointegrating vector, the maximum statistics failed to reject this.

Table 5.3. Tests for Number of Cointegrating Vectors for Aggregate Imports

H_0:r	n-r	λ_i	λ_{max}	λ_{max} (95%)	λ_{trace}	λ_{trace} (95%)
r = 0	4	0.384236	45.09**	27.1	77.65**	47.2
r≤1	3	0.1611373	16.37	21.0	32.55*	29.7
r≤2	2	0.107497	10.58	14.1	16.18*	15.4
r≤3	1	0.058509	5.607*	3.8	5.607*	3.8

Table 5.4 Outputs of Cointegration Analysis for Aggregate Imports (from PCFIML)

(i) Standardized β' Eigenvectors				
LRIMP	LRP	LFRERT	RGDP	$LRINR_{-1}$
1.000	0.6980	-0.6696	-0.4377	-0.2252
-0.2515	1.000	0.4323	0.2222	-0.1397
0.5492	-0.5166	1.000	-3.027	0.3899
0.3412	1.443	-0.6670	1.000	0.07845
(ii) Standardized α-Coefficients				
LRIMP	-0.4408	0.09871	-0.1029	0.1964
LRP	-0.3067	-0.3340	-0.05699	-0.1163
LRFERT	0.09648	-0.5389	-0.05720	0.2504
LRGDP	-0.06522	-0.01121	0.01337	0.003402

Vector AR 1-5 F(80,85) = 1.3306 [0.0978], Vector Normality $\chi 2$ (8) = 11.909 [0.1553],Number of lags: 11, Variables entered unrestricted: constant, seasonal dummies and dummy for structural break, Variable entered restrictively: LRINR-1

According to Johansen and Juselius (1990) as referred in Dhliwayo (1996), the power of the trace test is lower than the maximum eigenvalue test. Hence, one cointegrating vector is maintained since only the less powerful test, λ_{trace}, weakly rejected it but the more powerful test, λ_{max}, did not reject the same. Johansen (1992: 128) also obtained similar borderline results and maintained one cointegrating vector.

Diagnostic tests for vector autocorrelation and vector normality are also obtained from the PCFIML outputs. Accordingly, there is no problem of autocorrelation at one percent level of significance and vector normality at 5 percent level of significance. However, the degree of freedom did not allow testing for vector heteroscedasticity.

After establishing that there is one cointegrating vector, what is important for our analysis is the first column of α-matrix. However, the requirement is to impose linear restrictions on α-coefficients to identify which entries of the first column of α-matrix is statistically zero. This helps us to write endogenous variables conditioned on the other variables in the VAR. Such test for zero-restrictions on α-coefficients is sometimes referred to as a test for weak exogeneity[23] and undertaken using the likelihood ratio test[24]. Introducing weak exogeneity

[23] Engle, Hendry and Richard (1983) made a distinction between weak, strong and super exogeneity. They defined weak exogeneity as " given that the joint density of random variables (y_t , z_t) always can be written as the product of y_t conditional on z_t times the marginal product of z_t the weak exogeneity of z_t entails that the precise specification of the latter density is irrelevant to the analysis, and, in particular that all parameters which appear in this marginal density are nuisance parameters''.

[24] The likelihood ratio (LR) test used to test zero restrictions on α-coefficients takes the form (Harris 1995):

$$-2\log(Q) = T\sum_{i=1}^{r}\log\{\frac{(1-\hat{\lambda}_i^{*})}{(1-\hat{\lambda}\, i)}\}$$, where Q = (restricted MLE/unrestricted MLE), T = number of observations, λ_i and λ^*_i are eigenvalues for unrestricted and restricted models and r is rank.

thus provides us with a sufficient condition for conducting inference on our variable of interest with out loss of relevant sample information (Engle, et al, 1983).

Table 5.5 Tests for Zero-restrictions on α-coefficients for Aggregate Imports

	LRIMP	LRP	LRFERT	LRGDP
α-coefficient	-0.4408	-0.4067	0.09648	-0.06522
LR-test:χ^2 (~1)	4.3433	6.2222	0.13156	12.859
P-value	0.0372*	0.0126*	0.7168	0.0003**

**Rejection at 1% level of Significance. *Rejection at 5% level of significance.

It is evident from Table 5.5 that weak exogeneity is rejected for all variables except LRFERT. Since the LRIMP is found to be endogenous along with other variables, one possibility is to normalize our equation by this variable conditioning on the other variables. Choosing the LRIMP variable for the purpose of normalization, it is possible to obtain the equation that provides the estimates of long-run coefficients i.e. long-run import demand elasticities. That is, from Table 5.5 we have that,

$$\mathbf{LRIMP_t = 0.4377LRGDP_t - 0.6980LRP_t + 0.6696LRFERT_t + 0.2252LRINR_{t-1}}$$

The discussion of the long-run elasticities is postponed for the moment. However, it is important to discuss the speed of adjustment coefficient (α_{11}= -0.4408) at this juncture. This coefficient, which indicates the adjustment towards the long-run equilibrium, has a negative sign as theoretically expected and is statistically significant. Its magnitude reveals that

economic agents adjust by about 44% to their long-run steady state whenever there is a shock in the system.

Given the above cointegrating vectors, there is also a need to test for the significance of the long-run coefficients β in order to identify the unique cointegarting vector. These tests are given in Table 5.6 below.

Table 5.6Tests for Zero-restrictions on Long-run Coefficients for Aggregate Imports

	LRIMP	LRP	LRFERT	LRGDP	LRINR-1
β-coefficient	1.000	0.6980	-0.6696	-0.4377	-0.2252
LR-test:χ^2 (1)	26.476	7.1849	16.703	3.3849	14.376
P-value	0.0000**	0.0074**	0.0000**	0.0658	0.0001**

**Rejection at 1% level of significance.

A cursory look at Table 5.6 depicts that relative price, current foreign exchange receipts and international reserves are significant in explaining the country's import demand in the long run and have the expected signs. Real income, though positively affects import in the long run, is found to be statistically insignificant. This could happen, perhaps, due to the fact that whenever income increases most people spend it on domestic goods to satisfy their basic needs, as the Ethiopian economy is highly a subsistence economy. There is also a possibility to substitute imports by some domestic goods as the economy expands (see also Mwega, 1993 for Kenya). In this regard, the capacity to import as measured by foreign exchange receipts and official reserves does matter.

Once the long run relationships are established in the Johansen procedure, the next step is to know the coefficients of short-run dynamics (that of Γ_i) through the estimation of parsimonious vector error correction model (PVECM). The estimation of the short-run structure of the model also provides information on the short-run adjustment behaviour of economic variables, which is in turn important for policy implementation.

It was, however, previously obtained that the LR-test for zero-restrictions on α-matrix rejected weak exogeneity for relative price and real income together with real imports in which the former two are assumed to be explanatory variables (see Table 5.5). In this situation, the estimation of single equation using OLS would lead to the problem of simultaneous equation bias (Thomas, 1993). This problem can be overcome through simultaneous estimation of import demand equation together with the equation for LRGDP and LRP. One method of accomplishing such simultaneous estimation of these equations is the use of the two-stage least square (2SLS) method.[25]

From the estimation of 2SLS procedure, in which LRIMP, LRGDP and LRP are treated as endogenous in the model, the following results are obtained for the import demand equation (the other equations are not reported) with t-values in parenthesis:

[25] Other possible estimation methods in the literature include the full information maximum likelihood (FIML) and three-stage least squares (See Thomas 1993 for the discussion).

$$\Delta LRIMP_t = 0.02 - 0.25\Delta LRIMP_{t-1} - 0.10\Delta LRIMP_{t-2} + 0.54\Delta LRFERT_t + 0.16\Delta LRFERT_{t-1}$$

(0.433) (-1.739) (-0.885) (8.73) (1.707)

$$+ 0.08\Delta LRFERT_{t-2} + 0.41\Delta LRGDP_{t-1} - 0.23\Delta LRGDP_{t-2} + 0.02\Delta LRINR_{t-1} - 0.10\Delta LRINR_{t-2}$$

(0.940) (2.536) (-1.025) (0.184) (-1.176)

$$- 0.05\Delta LRINR_{t-3} + 0.15\Delta LRP_{t-1} + 0.13\Delta LRP_{t-2} - 0.15VECM_{t-1} - 0.02\ DM - 0.01S$$

(-0.814) (1.228) (1.028) (-0.999) (-0.283) (-0.140)

AR 1-2F (5,71) = 0.62125 [0.6840], Normalityχ^2 (2) = 7.8049 [0.0202]*

ARCH F (4,68)=0.37994 [0.8222]

In the estimated equation DM and S represent dummy for structural breaks and seasonal dummy, respectively and other variables are as defined in the previous section except that the difference operator (Δ) is added to indicate that the equation is in an error correction form.

In the estimation, the variables in the regression are in first difference and hence they are stationary. Thus, the use of the standard t-test and other diagnostic tests for the statistical evaluation of the results obtained from the equation is valid. Accordingly, the problems of autocorrelation and autoregressive conditional heteroscedasticity (ARCH) are rejected for import demand equation. Furthermore, the non-normality problem in the errors is rejected at 1 percent. The vector error correction term (VECM) has a negative coefficient as expected.

However, on the basis of the usual t-ratio, there exist a number of statistically insignificant variables in the model paving the way for further refinement of our equation. In this regard, the Hendry's "general-to-specific" modeling approach is adopted in which as many lags as possible are included in the model and a subsequent elimination of the insignificant

coefficients would be carried out until a parsimonious model is maintained. However, in striving for parsimony through model reduction process, the above simultaneously estimated model has to be abandoned and single equation estimation be adopted. The equations estimated for income (LRGDP) and price (LRP) that corresponds to real import demand equation was tested for parameter stability based on one-step ahead residuals and one-step ahead chow test following recursive estimation. Accordingly, they failed to pass the parameter constancy test in addition to other diagnostic tests (Fig. 5-1). When a variable is failed to pass the parameter constancy in a simultaneous estimation, it indicates that the variable is weakly exogenous in the system (Hendry, 1988, See also Solomon, 1999). Furthermore, according to Bardsen (1994:230), "the apparent nonconstancy of the marginal models forms the basis of the tests of the validity of the assumption of weak exogeneity." Ericsson (1991), quoted in Dhliwayo (1996), also pointed out that a more powerful test for exogeniety is the constancy of parameters. It is, therefore, possible to treat the income and price variables as weakly exogenous and include them as explanatory variables into the import demand equation. This enables us to carry out the estimation of single equation for the short run dynamics.

Fig. 5-1 Parameter Stability for Real GDP Equation of 2SLS Estimation (Imports)

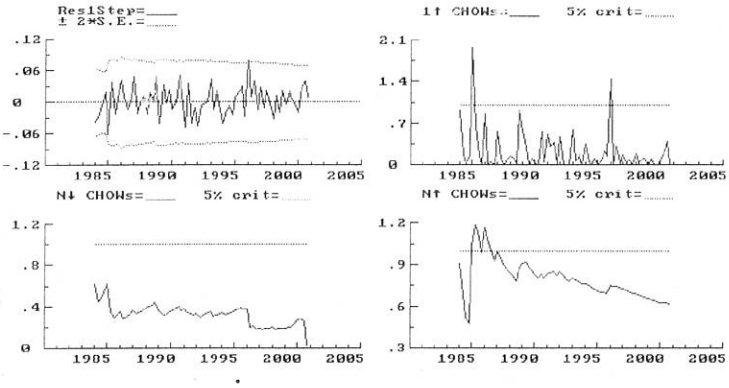
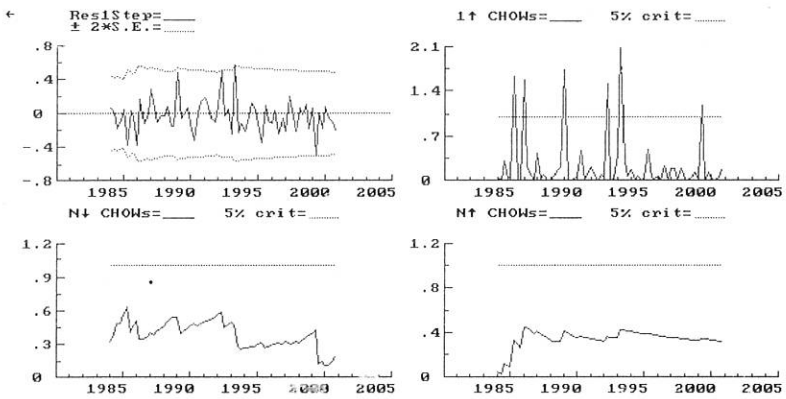


Fig. 5-2 Parameter Stability for Relative Price Equation of 2SLS Estimation (Imports)



Since the variables in the error correction system are now stationary, the single equation is estimated using the OLS. After a series of elimination of statistically insignificant variables, based on "general-to-specific" modeling approach, our final estimation results are summarized below.

$$\Delta LRIMP_t = 0.05 - 0.23\Delta LRIMP_{t-2} + 0.45\Delta LRFERT_t + 0.31\Delta LRGDP_t - 0.39\Delta LRP_t - 0.36VECMI_{t-1}$$

(2.07) (-3.59) (7.87) (2.36) (-4.22) (-3.96)

$$-0.18\ DM$$

(-2.11)

$R^2 = 0.66$, $F(6,89) = 29.01$ [0.00], DW = 2.27, RSS = 5.337

AR 1-5F (5,84) = 1.1799 [0.3260], ARCH 4 F (4,81) = 0.21807 [0.9277],

Normality χ^2 (2) = 5.4553 [0.0654], RESET F (1,88) = 0.02325 [0.8792]

In this refined PVECM, the lagged international reserve variable does not appear as it was found insignificant and consequently deleted from the equation. The magnitude of the coefficients of the variable is almost similar with that of 2SLS except for lagged error correction term and the dummy variable for structural break. The coefficients now represent the short run import demand elasticities having the signs that are consistent with what is expected. Concerning the diagnostic tests, the new RESET test is now introduced. The model evaluation diagnostic tests also show that the residuals are Gaussian with autocorrelation (based on LM statistic), ARCH (based on LM statistic) and nonnormality (based on Jarque-Bera test[26]), being rejected at one percent level of significance. According

[26] The Jarque-Bera (JB) test of normality is given by $JB = n[S^2/6 + (K-3)^2/24]$, where S represents skewness and K, kurtosis with the test having chi-square distribution with 2 df (Gujarati, 1995).

to the Ramsey's RESET test, the problem of misspecification of the model is rejected and hence our model is correctly specified.

B) Component Imports

Like what we have done for aggregate imports, we begin our analysis by the estimation of the long run relationships for component imports. The tests for the number of cointegrating relationships for both fuel and machinery imports are presented in Table 5.7.

Table 5.7. Tests for Cointegrating Vectors for Imports of Fuel and Machinery

a) Fuel H_0:r	n-r	λ_i	λ_{max}	λ_{max} (95%)	λ_{trace}	λ_{trace} (95%)
r = 0	4	0.454441	56.35**	27.1	92.99**	47.2
r ≤ 1	3	0.221167	23.25*	21.0	36.64**	29.7
r ≤ 2	2	0.106801	10.5	14.1	13.39	15.4
r ≤ 3	1	0.030573	2.888	3.8	2.888	3.8
b)Machinery						
r = 0	4	0.15851	14.84	23.8	30.15	39.9
r ≤ 1	3	0.102258	9.277	17.0	15.31	24.3
r ≤ 2	2	0.0488153	4.304	11.4	6.03	12.5
r ≤ 3	1	0.019878	1.727	3.8	1.727	3.8

**Rejection at 1% level of significance. *Rejection at 5% level of significance.

Considering the equation for fuel import, both the maximal and the trace statistics rejected the hypotheses of zero cointegration and one cointegration. Both, however, supported the existence of two cointegrating vectors for fuel import. Appealing to the theory, it is possible to define these two cointegtating vectors. The first vector defines the import demand equation while the second is the reserve flow equation defining foreign exchange as the function of relative price and real income. Once we are sure that there exist two vectors in the cointegartion space, it is possible to decide which vector we are dealing with. In our case, we are interested in the first cointegrating vector and continue discussing this vector.

On the other hand, both the maximum statistics and the trace statistics fail to reject the null hypothesis of no cointegration for machinery import. In this case, it can be concluded that there exists no long run relationship among the variables entering the cointegration space for machinery. In other words, the rank of Π-matrix is null and hence estimating the equation in first difference is appropriate (Enders, 1995). As a result, we are limited to discuss only the short run dynamics. For fuel import the long run β-coefficients or long run elasticities are quite large for relative price, real income and foreign exchange receipts and have the expected signs (Table 5.8).

Table 5.8 Outputs of Cointegration Analysis for Fuel Import (from PCFIML)

(i) Standardized β' Eigenvectors				
LRFUEL	LRPFU	LRGDP	LFRERT	$LRINR_{-1}$
1.000	1.219	-1.876	-0.7205	0.3967
-0.2515	1.000	5.259	-1.552	0.7581
0.5492	0.1677	1.000	-0.2222	-0.06530
0.3412	0.8395	2.330	1.000	0.2569
(ii) Standardized **α-Coefficients**				
LFUEL	-0.8505	0.6025	0.17606	0.09085
LRPFU	-0.3885	-0.4038	-0.4905	-0.1055
LRGDP	-0.0047	0.0028	-0.05919	0.0036
LFRERT	0.07142	0.2080	-0.1100	-0.1307

Vector AR 1-5 F(80,85) = 0.98468 [0.5270], Vector Normality $\chi 2$ (8) = 3.8399 [0.1466]

Number of lags: 11, Variables entered unrestricted: constant, seasonal dummies, Variable entered restrictively: LRINR-1

Taking the first cointegrating vector in to account, the speed of adjustment coefficient is fairly large indicating that the disequilibrium is corrected by about 85 percent in the long run. The coefficient has the expected negative sign.

Tests for weak exogeneity (zero restriction on α-coefficient) of the variables indicate that all variables except LFUEL are weakly exogenous (Table 5.9). In this regard, it is possible to express the long run relationship treating LFUEL as an endogenous and the rest as

explanatory variables, i.e. there is no need to estimate the equation in a simultaneous form. The long run equation is then:

$$\mathbf{LRFUEL_t = 1.876LRGDP_t - 1.219LRPFU_t + 0.7205LRFERT_t + 0.3967LRINR_{t-1}}$$

Where LRFUEL is real fuel imports, LRPFU is relative price of fuel import and other variables are as previously defined.

The magnitudes of the long run β coefficients, that is the long run elasticities, are fairly large for relative price of real fuel imports, real income and foreign exchange receipts having the expected signs. The lagged international reserve, however, has relatively low long run elasticity.

Table 5.9 Tests for Zero-restrictions on α and β Coefficients for Fuel

	LRFUEL	LRPFU	LRGDP	LRFRERT	LRINR-1
α-coefficient	-0.8505	0.6025	0.7606	0.0908	
LR-test:χ^2 (1)	10.688	1.9402	0.48994	0.49352	
P-value	0.0011**	0.1636	0.4840	0.4824	
β-coefficient	1.000	1.219	-1.876	-0.7205	-0.3967
LR-test:χ^2 (1)	28.789	20.271	10.82	26.442	12.508
P-value	0.0000**	0.0000**	0.0010**	0.0000**	0.0004**

**Rejection at 1% level of significance.

The LR test for zero restrictions on β coefficients also confirms that fuel imports are significantly influenced by its relative prices, real income, forex receipts and lagged international reserves in the long run (Table 5.9).

From the estimation of the parsimonious error correction model for component imports, the following results are obtained (t-values are in parentheses).

$$\Delta LFUEL_t = -0.16\Delta LFUEL_{t-4} - 0.22\Delta LFUEL_{t-5} + 1.66\Delta LRGDP_{t-4} - 0.43\,\Delta LRPFU_t - 0.53\,\Delta LRPFU_{t-4}$$

$$(-1.776) \qquad (-2.943) \qquad (2.029) \qquad (-1.747) \qquad (-2.485)$$

$$+ 0.81\Delta LRFERT_t + 1.14\Delta LRINR_{t-1} - 0.66VECMF_{t-1} + 1.51S1 - 1.29S2$$

$$(3.240) \qquad (4.651) \qquad (-4.073) \qquad (5.015) \qquad (-3.756)$$

$R^2 = 0.66$ DW = 2.21 RSS = 103.949

AR 1-5F (5,77) = 1.6515 [0.1565], ARCH 4 F(4, 74) = 0.0849 [0.9868]

Normality χ^2 (2) = 0.07198 [0.9646], RESET F(1, 81) = 0.94973 [0.3327]

$$\Delta LMACH_t = -0.22 - 0.22\Delta LMACH_{t-1} - 0.24\Delta LMACH_{t-2} - 0.21\Delta LMACH_{t-3} + 1.38\Delta LRGDP_{t-1}$$

$$(-1.713) \quad (-6.426) \qquad (-2.815) \qquad (-2.546) \qquad (1.702)$$

$$- 0.34\,\Delta LRPM_t + 0.32\Delta LRFERT_t + 0.34\Delta LRFERT_{t-} + 0.35\Delta LRINR_{t-2} + 0.8151S3$$

$$(-5.858) \qquad (2.990) \qquad (3.093) \qquad (3.312) \qquad (1.854)$$

$R^2 = 0.89$ DW = 2.11 RSS = 23.505

AR 1-5F (5,85) = 1.8568 [0.1105], ARCH 4 F(4, 82) = 1.4751 [0.217?]

Normality χ^2 (2) = 4.2208 [0.1212], RESET F(1, 89) = 1.2292 [0.2706]

In the second equation, LMACH is real import of machinery and LRPM is its relative price. The short run models for both fuel and machinery have passed the diagnostic tests.

Accordingly, problems of autocorrelation, ARCH, non normality and misspecification are not detected in both equations. The short run elasticities are well below their long run counterparts for fuel except that of international reserves which are larger in the short run. Real income, relative price of fuel imports, foreign exchange receipts and lagged international reserves significantly affect the import demand for fuel. The import demand for machinery is also influenced by its relative price and other included variables in the short run.

C) Aggregate Exports

In the application of the Johansen cointegration analysis to export demand equations the weighted GDP of trading partners entered the cointegration space restrictively. Such restriction is imposed since the country does not affect the income of its trading partners. Using the Johansen tests of cointegation for aggregate export equation, like we did for imports, one cointegrating vector is identified. In this case, what is interesting is the first column of α-matrix.

Table 5.10. Tests for Number of Cointegrating Vectors for Aggregate Exports

H_0:r	n-r	λ_I	λ_{max}	λ_{max} (95%)	λ_{trace}	λ_{trace} (95%)
r = 0	2	0.302477	35.66**	14.1	37.66**	15.4
r≤1	1	0.019962	1.996	3.8	1.996	3.8

**Rejection at 1% level of significance.

Table 5.11 Outputs of Cointegration Analysis for Aggregate Exports (from PCFIML)

(i) Standardized β' Coefficients		
LREXP	LRPX	LRGDPX
1.000	0.1608	-0.07083
1.117	1.000	-0.07419
(ii) Standardized α-Coefficients		
LREXP	-0.8810	0.03950
LRPX	0.6530	-0.1222

Vector AR 1-5 F(20, 142) = 1.5866 [0.0636]

Vector Normality $\chi 2$ (8) = 6.7495 [0.1497]

Vector XiY' F(66, 171) = 0.8293 [0.8073)

Vector Xi *Xj F(231,6) = 0.12413 [1.0000]

Number of lags: 5

Variables entered unrestricted: constant, seasonal dummies and dummy for structural break. Variable entered restrictively: LRGDPX

In the estimated long run aggregate export equation, there is no evidence of vector autocorrelation, vector nonnormality, vector ARCH and vector functional misspecification. Hence, the long run model passes all the diagnostic tests.

From the test of weak exogeneity, real exports (LREXP) and the relative price (LRPX) failed to pass the test. Hence, the two variables are treated as endogenous. However, taking in to account real exports only, the long run relationship is expressed as:

$$LREXP_t = 0.07083LRGDPX_t - 0.1608LRPX_t$$

From this equation, it is clearly observed that both the long run income and price elasticities of demand for exports are very small.

Looking at the α-coefficients, the speed of adjustment to long run equilibrium is relatively fast (Table 5.11). It indicates that whenever there are shocks in the system, about 88 percent of the nuisance would be corrected in the long run.

Table 5.12 Tests for Zero-restrictions on α and β Coefficients for Aggregate Exports

	LREXP	LRPX	LRGDPX
α-Coefficient	-0.8810	0.6594	
LR-test:χ^2 (1)	31.884	17.263	
P-value	0.0000**	0.0000**	
β-Coefficient	1.000	0.1608	-0.07083
LR-test:χ^2 (1)	17.308	1.4893	0.58313
P-value	0.0000**	0.2223	0.4451

**Rejection at 1% level of significance.

Testing for the significance of long run β-coefficients, both the coefficients of relative price and weighted GDP of the country's trading partners are found to be statistically insignificant. This may be due to the fact that the country would abandon the export of primary commodities and diversify its exports towards the manufactured goods in the long run. In this

regard, foreign price and foreign income may have little impact on the goods the country is exporting. On the other hand, foreign income has the short run characteristics, as it is an exogenous variable.

Coming back to the estimation of the short run model, the first step is to test for the weak exogeneity of the variables. As previously mentioned, it is found that both real exports and relative price are endogenous in the export demand equation. The possibility that there is simultaneity[27] problem between export quantities and prices has long been identified and there are accumulated evidences as to how it should be corrected once its occurrence is noticed (see Goldestein and Khan, 1985).

In our case, we resort to the use of two-stage least squares, as we have done for aggregate imports, and estimate the real exports and price equations simultaneously. Hence, applying the 2SLS to these equations the following results are obtained for real export equation.

$$\Delta LREXP_t = 0.03 + 0.21\Delta LREXP_{t-1} - 0.05\Delta LREXP_{t-2} + 0.39\Delta LRPX_{t-1} + 0.01\Delta LRPX_{t-2}$$

$$(-0.034) \quad (1.027) \quad (-0.347) \quad (2.246) \quad (0.034)$$

$$+0.06\Delta LRGDPX_t + 0.05\Delta LRGDX_{t-1} + 0.02\Delta LRGDX_{t-2} - 83VECMX_t - 18S$$

$$(0.431) \quad (0.397) \quad (0.150) \quad (-3.838) \quad (-1.674)$$

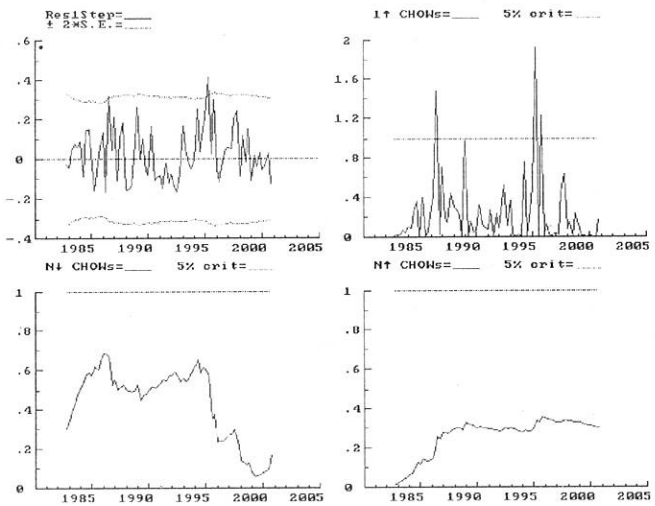
AR 1-2F (2, 85) = 2.9011[0.0604], Normality χ^2 (2) =14.859 [0.00), ARCH F(16,71) = 1.844[0.0416], Vector AR 1-2 F(8,166) = 6.4572[0.00], Vector Normality χ^2 (4) = 12.559[0.0136], Vector ARCH F(48,206) = 1.1364[0.2685]

[27] The problem of simultaneity implies that there is correlation between the explanatory variables in an equation and the error term, violating one of the conditions for the application of classical least squares analysis (Goldestein and Khan, 1985).

In this export equation estimated by 2SLS, there are a lot of insignificant variables. This requires the elimination of such insignificant variables to obtain a more parsimonious model. To carry out the reduction of the variables that do not explain the model, we have to estimate a single equation.

The residuals one-step ahead and one-step ahead chow test of the price equation that corresponds to the real export equation has depicted parameter instability (Fig.5.3). Consequently, the relative price variable is treated as exogenous and included in the single equation.

Fig. 5.3. Parameter Stability for Relative Price Equation of the 2SLS Estimation (Exports)



The parsimonious vector error correction mechanism (PVECM) for real exports after including the price variable in to single equation and subsequent elimination of insignificant variables is the following:

$$\Delta LREXP_t = 0.27 + 0.09\ \Delta LRGDPX_{t-2} - 0.76\ \Delta LRPX_t - 0.22\ \Delta LRPX_{t-1} - 0.11\ \Delta LRPX_{t-2}$$

(7.777) (1.648) (13.484) (-2.817) (-2.020)

$$- 0.66 VECMX_{t-1} - 0.47S - 0.44S_1 - 0.19S_2$$

(-6.381) (-9.956) (-8.482) (-3.799)

$R^2 = 0.87$, $F(8, 89) = 75.207$ [0.00], DW = 2.30, RSS = 1.766

AR 1-5F (5,84) = 1.9114 [0.1010], ARCH 4 F(4, 81) = 0.79766 [0.5302],

Normality $\chi^2 = 0.99714$ [0.6074], RESET F(1, 83) = 0.11127 [0.7395]

The short run model for real export passes all the diagnostic tests. Both the income of trading partners and the relative prices explain the country's export significantly. The fact that foreign GDP has relatively significant effect in the short run but insignificant in the long run explains its being beyond the influence of the country which is the characteristic behaviour of exogenous variables. The short run elasticities are also low. The coefficient of lagged error correction term is negative and significant.

D) Component Exports

The component export items to be discussed here are coffee and hides and skins. These are chosen for the analysis, as they are the major export items of the country. Obviously, the analysis for component exports is begun by testing for the number of cointegrating vectors in the estimation equations of coffee and hides and skins. Accordingly, the null hypothesis of no cointegration is not rejected by both the maximal and the trace statistics at one percent level of significance (Table 5.13). Hence, there are zero cointegrating vectors for both commodities.

Table 5.13. Tests for Number of Cointegrating Vectors (Coffee and Hides and Skins)

a) Coffee H_0:r	n-r	λ_I	λ_{max}	λ_{max} (95%)	λ_{trace}	λ_{trace} (95%)
r = 0	2	0.083438	8.364	14.1	13.61	15.4
r ≤ 1	1	0.053210	5.249*	3.8	5.249*	3.8
b) Hides & Skins						
r = 0	2	0.109986	11.07	14.1	11.38	15.4
r ≤ 1	1	0.003261	0.3104	3.8	0.3104	3.8

*Rejection at 5% level of significance.

Once zero cointegrating vectors are determined, the equations are estimated by first difference. The results of the estimation of the short run equations are given below.

$$\Delta LCOF_t = 0.11 - 0.77\Delta LCOF_{t-1} - 0.66\Delta LCOF_{t-2} - 0.43\Delta LCOF_{t-3} + 0.29\Delta LRGDPX_t - 0.52\Delta LRPCOF_t - 0.42 S_1$$

(-1.939) (-11.613) (-8.181) (-5.525) (1.786) (-4.859) (-3.710)

$R^2 = 0.71$, F(6,93) = 37.797, DW = 2.00, RSS = 17.606 AR 1-5F (5,88)=1.273 [0.2828], ARCH 4 F(4, 85) = 1.2624 [0.2912], Normality χ^2 = 5.7654 [0.0560], RESET F(1, 92) = 0.13654 [0.7126]

$$\Delta LHIDSK_t = -0.25\Delta LHIDSK_{t-1} - 0.24\Delta LHIDSK_{t-2} - 0.19\Delta LHIDSK_{t-4} - 0.48\Delta LRPHIDSK_t - 0.64S - 0.32S1$$

(-3.503) (-3.647) (-2.897) (-8.150) (-5.855) (-3.083)

R^2 = 0.75, DW = 2.460, RSS = 11.384, AR 1-5F (5,88) = 2.1159 [0.0709], ARCH 4 F(4, 85) = 0.75928 [0.5547], Normality χ^2 = 6.9091 [0.0316]*, RESET F(1, 92) = 0.11488 [0.7354]

Where LCOF is log real export of coffee, LRPCOF is log relative price of coffee, LHIDSK is log real export of hides and skins, LRPHIDSK is log relative price of hides and skins and S and S_1, are seasonal dummies and other variables are as defined before.

The diagnostic tests for the estimated equations showed that the results obtained for component exports are relatively acceptable. In the case of the first equation, which is for coffee, there is no problem of autocorrelation, ARCH, nonnormality and model misspecification. The equation estimated for hides and skins also rejected autocorrelation, residual heteroscedasticity and misspecification of the model. The nonnormality problem is not detected at one percent level of significance. Hence, the residual can generally be considered as Guassian (See Harris, 1995 for similar analysis).

In the first equation the foreign income, relative prices and lagged exports are significant, but in the second income is insignificant and dropped from the equation. However, the short run elasticities are far below unity for both coffee and hides and skins.

5.2. Interpretation of Results

Based on the estimation of the general import equation for aggregate imports, the respective long run price and income elasticities of demand for imports are -0.69 and 0.43. On the other hand, their short run counterparts are -0.39 and 0.31. The long run and the short run elasticities for foreign exchange receipts are 0.66 and 0.45, respectively. The lagged international reserve has a long run elasticity of 0.23. As theoretically expected, the price

elasticity is negative while that of income is positive. The short run price elasticity is far below its long run again, which is consistent with what is expected. In the case of income, the variation between the two elasticities is small. These results are comparable with the results of previous works such as that of Moran (1989), Mwega (1993) for Kenya and Egwaikhide (1999) for Nigeria (see Table 2.1 under Chapter 2). Our results are, however, different from those obtained by. Muluneh (1982) and Solomon (2000) for Ethiopia While the former estimated the income elasticity to be –0.5 and that of forex receipts 1.2, the latter obtained short run income elasticity of 0.22 and long run price and income elasticities of 0.22 and 0.86 but lagged reserve of 3.56. In our case all variables except GDP affect imports significantly in the long run. One possible explanation could be the country might start substituting some of the imported goods as its income increases over time. In the short run, however, all variables are found to be significantly affecting imports.

Concerning the component imports, for fuel import, the long run price, income, forex receipts and the lagged official reserves elasticities are -1.22, 1.87, 0.72 and 0.39, respectively as against -0.43, 1.66, 0.81 and 1.14 in the short run. These elasticities are higher both in the long run and short run for income and current foreign exchange receipts. It is smaller for price in the short run but the reverse holds for lagged reserves.

In the case of exports, the country faces lower elasticities of price and income both in the long run and short run. Both relative prices and foreign income insignificantly affect the country's exports in the long run but prices are only significant at 10 percent in the short run. The fact that the foreign income and relative income are insignificant may explain the ability of the

country to diversify its exports and hence able to produce the commodities which cannot be influenced by the trading partners.

For component exports, the short run price elasticities are –0.52 for coffee and –0.48 for hides and skins. The income elasticity is 0.29 for coffee. While real income is significant at 10 percent for coffee, it is found to be insignificant for hides and skins.

CHAPTER SIX: CONCLUSSION AND POLICY IMPLICATIONS

Conclusion

As to what determine the flow of international trade between countries is a debatable issue. In this sphere, the current paper has tried to shed light up on the determinants of foreign trade flows of Ethiopia with particular emphasis to the demand side. Thus, the demand for imports and exports and their components was estimated.

After conducting the model selection tests, the general (eclectic) import demand model, which defines real imports as the function of real income, relative prices of imports, lagged imports, foreign exchange and one period lagged international reserves, has been estimated. Similar definition has been adopted for import components. In the case of export demand equation, real export has been expressed as the function of its relative prices and weighted GDP of major trading partners less their exports. For component exports, we have also used similar expression replacing aggregate real exports and relative prices by that of individual exports.

The estimation procedure has been accomplished by resorting to the currently developed time-series econometric techniques. As the first step, the order of integration of individual variables has been determined employing the commonly used DF and ADF tests. In most cases, the variables entering the regression are found to be integrated of order 1, I(1). In determining the long run behaviour of the variables, the Johansen multivariate cointegration

test has been employed as it posses a unique advantage over the residual-based two-step Engle-Granger approach.

Applying the Johansen procedure to aggregate import demand functions, both λ_{max} and λ_{trace} statistics of the likelihood ratio test have confirmed the existence of one cointegrating relationship among the variables in the regression i.e. real imports, relative prices of imports, real income, foreign exchange receipts and lagged international reserves. The results of the cointegartion outputs have also indicated that the long run import demand elasticities are relatively higher for relative price and foreign exchange than that of real income and lagged reserves. They have the expected signs in the sense that while real income, forex receipts and lagged official reserves have positive influence on imports, relative price affects imports negatively. Tests on the β coefficients have also indicated that real income affects imports insignificantly in the long run, but other variables such as relative prices of imports, foreign exchange receipts and lagged reserves have a significant impact. In order to condition real imports on other variables, the test for weak exogeneity was also conducted. The results indicated that all variables other than current foreign exchange receipts have been endogenous leading us to the simultaneous estimation of the model using the 2SLS. After testing for parameter constancy, the real income and the relative price equations failed to pass the test. As a result, a single equation was estimated. Based on the David Hendry's "general-to-specific" modeling approach, a parsimonious vector error correction model (PVECM), which gives us theory-consistent and data-coherent results, has been obtained. This enables us to obtain the short run elasticities. Accordingly, the short run elasticities, apart from having the expected signs, were found to be small. All the explanatory variables except the lagged

reserves were found to be significant in the short run. The lagged import though significant has the negative sign.

For component imports in which demand for imports of fuel and machinery was estimated, two cointegrating vectors was found for the former but zero vector for the latter. In the case of machinery, since zero cointegrating vectors are maintained, only the short run dynamics is relevant. All variables significantly affect fuel imports in the long run. Moreover, the long run elasticities are, in general, larger than the short run ones for fuel. The lagged fuel import has also a negative relationship with current imports in the short run. For imports of machinery, real income has larger short run elasticity than other variables but it is weakly significant (significant only at 10 percent). The current import demand for machinery is also indirectly related with its lagged imports.

Following the same estimation method as under imports, in the aggregate export demand model, the Johansen procedure supported the existence of one cointegrating vector. In addition to having smaller long run elasticities both the relative price and foreign GDP were found to be insignificant in affecting the country's exports. The short run dynamics was also estimated after testing of weak exogeneity for the variables. The relative prices and real exports were found to be endogenous and the former failed to pass the parameter constancy test in the simultaneous equation estimation enabling us to estimate single equation. Again, after eliminating the statistically insignificant variables, the short run export demand elasticities were obtained from the parsimonious model. Likewise, the short run elasticities are relatively small.

For coffee and hides and skins, the maximal and the trace statistics confirmed zero cointegrating vectors. The equation was then estimated in first difference giving the short run elasticities. As expected, the export of these primary commodities faces low foreign real income and price elasticities in the short run. The export demand for coffee and hides and skins has a negative relationship with lagged exports. The latter result is obtained since the country has limited number of buyers of its commodities, which may meet their demand with previous imports leaving less room for current demand of the country's goods.

Policy implications

From the results of the study, the following policy implications can be derived. The inelastic price elasticities of demand for imports imply that price policies such as devaluation have less impact to reduce the volume of imports. Moreover, the lower real income elasticity for aggregate import together with its being weakly significant for import components implies that stabilization policies are less powerful in assisting trade liberalization efforts. More generally, policies that have direct influence on the foreign exchange availability in the form of capital inflow and export earnings are more likely to affect import volumes than those that concentrate exclusively on the exchange rate and aggregate demand management. In this regard, it is possible to manage the supply of foreign exchange in the existing forex auction in order to influence the volume of imports.

On the flow of exports of the country, since its export of primary commodities are facing low real income and price elasticities in the world market, policies that enhance the diversification

of exports and facilitate the shift towards the export of semi-processed and manufactured goods are essential. One obvious option in this case is to make huge investment in the export sector through a coordinated effort between the private sector and the government. The negative relationship between current export demand and the lagged exports also implies that the country has to diversify the destination of its exports.

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APPENDICES

Appendix 1

Average Growth Rate in GDP and Its Components

	1974/75-1979/80	1980/81-1989/90	1974/75-1990/91	1991/92-1999/00	1974/75-1999/00
Agriculture	1.2	1.3	1.5	1.8	1.6
Industry	2.3	2.7	1.3	6.9	3.2
Distr. Services	0.9	3.2	0.8	7.3	3.1
Other Services	5.5	7.2	5.9	8.3	6.7
GDP	1.8	2.6	1.9	4.7	2.8

Sources: Calculated from MEDaC data

Appendix 2

Share of Major Export Items In Total Export Value

Period	Coffee	Oil Seeds	Hides & Skins	Pulses	Chat	Total	Industrial Products[1]
	(1)	(2)	(3)	(4)	(5)	(6=1+2+3+4+5)	7
1970/71	58.7	1.3	7.9	6.5	0.	75.2	0.1
1971/72	51.8	11.9	9.4	8.0	1.	82.3	3.1
1972/73	44.3	12.8	14.8	9.5	0.	82.2	2.7
1973/74	28.1	15.3	9.9	19.7	0.	73.8	3.1
1974/75	24.7	18.7	7.8	15.5	1.	67.9	4.6
1975/76	55.3	6.6	7.9	9.8	0.	80.3	2.6
1976/77	63.9	4.2	8.2	7.6	1.	85.1	2.6
1977/78	78.9	1.8	8.9	4.7	0.	94.8	4.1
1978/79	77.4	1.3	14.5	2.5	1.	96.8	0.6
1979/80	66.5	1.4	14.9	2.6	2.	87.4	1.0
1980/81	61.6	3.3	10.9	2.8	2.	81.2	11.3
1982/83	61.2	1.9	9.5	3.6	4.	80.8	11.2
1983/84	63.5	3.0	10.1	2.2	3.	81.9	10.0
1984/85	62.6	2.1	12.8	2.3	2.	81.9	12.4
1985/86	72.0	0.8	12.9	1.4	0.	88.0	5.9
1986/87	65.9	1.2	13.6	1.1	3.	85.5	5.0
1987/88	56.8	2.8	17.2	2.1	2.	81.6	6.5
1988/89	69.4	1.2	13.7	1.8	0.	87.0	3.8
1989/90	55.0	1.1	18.2	4.9	2.	82.0	5.0
1990/91	49.5	0.7	17.0	2.9	3.	73.8	12.0
1991/92	60.3	0.1	21.0	0.1	1.	83.4	12.6
1992/93	67.1	0.1	16.8	0.5	8.	92.7	4.0
1993/94	58.0	3.6	16.4	2.2	8.	88.9	6.3
1994/95	65.8	1.8	13.7	3.8	6.	91.4	3.9
1995/96	67.9	1.7	12.2	3.0	6.	91.7	2.5
1996/97	66.2	2.1	10.7	2.5	5.	87.3	2.4
1997/98	69.8	7.6	8.4	2.5	6.	94.8	0.4
1998/99	60.2	7.7	6.9	2.9	12.	90.4	0.0
1999/2000	57.5	6.6	8.0	2.1	14.	88.8	0.0
Average	60.0	4.3	12.2	4.5	3.	84.8	5.0

[1]Includes sugar, oilcakes and petroleum products.

Source: National Bank of Ethiopia Quarterly Bulletin, Various Issues

Appendix 3

Share of Ethiopia's Export in the World Coffee Trade

Year	World Export	Eth. Export	Share
1968/69	3188760	79273	2.5
1969/70	3228960	80449	2.5
1970/71	3199560	79929	2.5
1971/72	3513900	85588	2.4
1972/73	3615420	83536	2.3
1973/74	3455520	57850	1.7
1974/75	3418200	58038	1.7
1975/76	3488460	71747	2.1
1976/77	3198900	42959	1.3
1977/78	3118800	73840	2.4
1978/79	3887100	82906	2.1
1979/80	3674640	78507	2.1
1980/81	3567900	87906	2.5
1981/82	3812040	79614	2.1
1982/83	3943860	90768	2.3
1983/84	4201080	97894	2.3
1984/85	4136640	68963	1.7
1985/86	4132740	73190	1.8
1986/87	4383360	73412	1.7
1987/88	3730560	83099	2.2
1988/89	4302600	84022	2.0
1989/90	4870260	82930	1.7
1990/91	4458720	50967	1.1
1991/92	4668300	40120	0.9
1992/93	4670700	69610	1.5
1993/94	4317600	79920	1.9
1994/95	3904077	79244	2.0
1995/96	4302371	106639	2.5
1996/97	4809828	111206	2.3
1997/98	4628247	125394	2.7
1998/99	5029452	105398	2.1
1999/2000	5279826	120303	2.3

Source: Coffee and Tea Authority

Appendix 4

Unit Value of Coffee Export, Washed and Unwashed

Coffee Year	Unwashed			Washed			Unit value Washed/ Unwashed
	Volume (Tons)	Value ('000 Birr)	Unit Value	Volume (Tons)	Value ('000 Birr)	Unit Value	
1976/77	39031	425892	1091	3928	46699	11889	1.1
1977/78	68430	527710	771	5410	51245	9472	1.2
1978/79	75227	492428	654	7679	51655	6727	1.0
1979/80	71563	548158	766	6944	60213	8671	1.1
1980/81	79876	428217	536	8030	56082	6984	1.3
1981/82	69009	410595	595	10605	74179	6995	1.2
1982/83	80657	451225	559	10111	62918	6223	1.1
1983/84	88448	541607	612	9446	64321	6809	1.1
1984/85	58805	369338	628	10158	69580	6850	1.1
1985/86	60759	594270	978	12431	120926	9728	1.0
1986/87	58743	329905	561	14669	93688	6387	1.1
1987/88	69290	449982	649	13809	105956	7673	1.2
1988/89	61648	365270	592	22374	168124	7514	1.3
1989/90	66583	279059	419	16347	73325	4486	1.1
1990/91	39799	180331	453	11168	63133	5653	1.2
1991/92	32786	162420	495	7334	51678	7046	1.4
1992/93	59628	469111	786	9982	173049	17336	2.2
1993/94	70800	796991	1125	9120	171594	18815	1.7
1994/95	68843	1608004	2335	10401	290835	27962	1.2
1995/96	93512	1511872	1616	13127	255762	19484	1.2
1996/97	93809	1909751	2035	17397	409882	23560	1.2
1997/98	109555	2271408	2073	15839	614565	38801	1.9
1998/99	84170	1520376	1806	21228	569101	26809	1.5
1999/2000	87342	1413790	1618	32961	686163	20817	1.3
Average	70346.38	752404.6	9900.	12520.8	182694.7	13028.8	1.3

Source: Coffee and Tea Authority

Append ix 5

Ratio of Exports (EXP) to GDP and to Imports (IMP), Imports (IMP) to GDP (Percent) and Growth Rate of Exports

Year	EXP/GDP	EXP/IMP	IMP/GDP	Growth rate
1970/71	5.9	69.1	8.6	
1971/72	5.8	69.2	8.4	3.
1972/73	8.1	103.9	7.8	40.
1973/74	10.1	114.5	8.8	32.
1974/75	7.3	71.0	10.2	-20.
1975/76	8.2	79.3	10.4	12.
1976/77	9.1	86.4	10.5	19.
1977/78	8.3	84.1	9.9	4.
1978/79	8.7	61.1	14.3	11.
1979/80	10.0	64.7	15.4	27.
Average	8.1	80.3	10.4	13.
1980/81	8.4	61.5	13.7	-10.
1981/82	7.3	47.4	15.4	-8.
1982/83	4.3	29.1	14.9	4.
1983/84	7.1	45.0	18.8	14.
1984/85	5.7	42.1	13.6	-19.
1985/86	6.9	42.6	16.3	24.
1986/87	5.6	36.2	15.5	-13.
1987/88	5.3	34.6	15.2	-2.
1988/89	5.8	43.5	13.4	16.
1989/90	4.5	41.5	10.8	-18.
Average	6.1	42.4	14.8	-1.
1990/91	3.0	26.9	11.1	-26.
1991/92	1.5	17.6	8.7	-48.
1992/93	3.5	26.2	13.5	18.
1993/94	5.0	29.9	16.7	24.
1994/95	8.4	43.3	19.3	120.
1995/96	6.9	33.8	20.3	-8.
1996/97	9.4	45.8	20.5	33.
1997/98	9.2	44.3	20.7	12.
1998/99	7.1	30.0	23.8	-22.
1999/2000	7.1	104.1	23.6	4.
Average	6.1	40.2	16.2	10.

Source: Calculated from Data Obtained from the NBE and MEDaC

Appendix 6

Structure of Imports as a Percentage of Total Import by End Use

	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
Raw Materials	5.8	4.1	3.6	3.9	4.3	3.9	3.8	3.4	3.4	3.5	2.8	3.8	2.2	2.4
Semi-finished Goods	21.9	20.7	16.4	12.7	19.9	19.1	13.6	13.6	14.4	11.7	13.6	11.7	12.0	14.4
Fuel	20.9	18.3	14.4	16.0	13.4	23.4	24.9	22.0	22.6	18.3	18.0	11.4	10.1	9.5
Capital Goods	13.7	26.1	28.6	29.8	36.0	30.5	32.7	33.5	32.9	45.0	29.1	33.6	42.8	47.1
Consumer Goods	37.0	38.2	33.9	34.5	33.3	20.9	24.9	27.3	26.4	21.0	36.4	39.3	32.6	26.3
Others	0.7	0.3	3.1	3.1	1.6	2.2	0.2	0.1	0.2	0.4	0.1	0.2	0.3	0.3
	1988/89	1989/90	1990/91	1991/92	Average	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	Average
Raw Materials	2.6	3.2	2.7	1.6	3.4	2.0	1.8	2.0	2.3	2.0	2.0	1.7	1.2	1.9
Semi-finished Goods	16.9	17.6	11.1	8.8	15.0	9.0	16.3	17.0	16.4	19.1	16.4	16.8	12.7	15.5
Fuel	10.1	12.3	9.9	13.8	16.1	22.7	15.3	15.2	19.3	17.9	13.9	10.7	24.5	17.4
Capital Goods	39.0	38.6	45.3	25.8	33.9	35.0	29.2	31.9	33.7	38.8	29.8	33.7	29.2	32.7
Consumer Goods	30.7	28.1	30.2	29.7	30.6	31.3	35.1	32.5	29.8	20.6	37.0	28.1	26.8	30.2
Others	0.7	0.2	0.9	20.3	1.9	0.1	2.2	1.5	1.9	1.0	7.7	8.3	14.5	4.6

Source: Computed from Data Obtained From the NBE.

Appendix 7

GENERATING QUARTERLY GDP FROM ANNUAL GDP

Since quarterly GDP is not available for the country, quarterly figures are generated using the annual GDP. According to Bahmani-Oskooee (1987:123), the generated quarterly data for GDP need be should be adjusted in such away that

$$QI + QII + QIII + QIV = \text{Annual GDP}.$$

Based on this, since the Ethiopian production is highly subject to seasonal variations some adjustment would be made based on certain coefficients as follows:

Agriculture

Data on labour requirements for each agricultural operation for major cereal crops per hectare were obtained from DBE. Based on labour input in agriculture (the man-days), coefficients for each quarter are derived. That is, the activities are carefully identified in which quarter they are performed and the weight attached to each activity is used in the quarter.

Table Appendix 7 (a) Labour Requirements in Each Agricultural Activities (Man-days)

	Barely	Wheat	Teff	Maize	Sorghum	Average	Ratio
1st Plaughing	4	4	5	7	5	5	0.075
2nd Plaughing	4	4	5	7	5	5	0.075
3rd Plaughing	3	3	5	3	-	3	0.045
Planting, sowing, covering	4	4	6	8	4	5	0.075
1st weeding	15	11	22	20	24	18	0.268
2nd weeding	-	-	-	24	7	6	0.089
Harvesting	13	18	18	9	9	13	0.194
Threshing, widowing (shelling)	7	10	17	19	9	12	0.179
Total	50	54	78	88	63	67	1.00

The allocation of each activity to each quarter and the derivation of the coefficients are performed as follow:

July, August & September (QI) = Sowing & 1st weeding

October, November & December (QII) = 2nd weeding & Harvesting

January, February & March (QIII) = Threshing

April, May & June (QIV) = Plaughing (1st, 2nd & 3rd)

For each quarter the coefficients are:

QI = 0.075 + 0.268 = 0.343

QII = 0.089 + 0.194 = 0.283

QIII = 0.179

QIV = 0.075 + 0.075 + 0.045 = 0.195

Since the Belg season (small rain season) is very small, relative to the main season, it is ignored.

Industry

Data on the production of twentyeight industrial public enterprises are available on quarterly basis (MEDaC). These are used to obtain coefficients for the breakdown of the industrial sector. Accordingly, the share for each quarter is determined and the shares for corresponding quarters are averaged to obtain a single coefficient for each quarter. Hence, we have the following coefficients.

Table Appendix 7 (b) Public Enterprises Production & Ratios

Quarter	Total Production	
QI	1162178	0.217
QII	1385103	0.259
QIII	1412160	0.265
QIV	1388841	0.259
Total	5348282	1.000

Services

Quarterly data on the disbursement of loans to distributive services (domestic and international trade, hotels and restaurants and transport and communication) from the banking system are used to obtain coefficients that help to disaggregate the "Distributive Services". In addition, the "Other Services" section of the MaDEC's classification are assumed to be the same over quarters and hence distributed equally to each quarter.

The coefficients for services and the way they derived are presented in the following table.

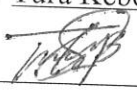
Table Appendix 7 (c) Disbursement of Loans to Distributive Services and Coefficients

Distributive Services	QI	Ratio	QI	Ratio	QI	Ratio	QI	Ratio
Domestic trade	458	0.164	3351.5	0.377	2705.3	0.304	1368.6	0.154
International trade	791.4	0.184	1006.4	0.234	1476.2	0.344	1019.8	0.237
Hotels& Restaurants	300.2	0.258	314.7	0.271	247.4	0.212	299.8	0.257
Transport & Comm.	459.1	0.198	598.6	0.258	566.4	0.244	693.1	0.299
Average Ratio		0.201		0.285		0.276		0.237
Other Services		0.25		0.25		0.25		0.25

DECLARATION

I, the undersigned, declare that this thesis is my own original work and it has not been presented for a degree in any other university. All sources of materials for this thesis have been dully acknowledged.

Name: Tura Kebede

Signature 

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