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MODELING THE PRINCIPAL EXPORT COMMODITIES OF ETHIOPIA (1970/71-2003/04)

BY

KASSAHUN ABERRA

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School of Graduate Studies

Modeling the Principal Export Commodities of Ethiopia (1970/71 – 2003/04)

By

Kassahun Aberra Endeshaw

Approved by the Board of Examiners:

Girma Estifanos	
Advisor	Signature
Tavis Barr	
Examiner	Signature
Emmanuel G. Yohannes	
Examiner	Signature

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Abstract

This study endeavored to model the principal export commodities of Ethiopia such as Coffee, Oilseeds, Khat, Pulses, Hides and Skins, Other exports and manufactured exports using time series data from 1970/71-2003/04. Since Ethiopia is price taker in the international commodity market, emphasis is made to the supply side of the model. In addition, as the sample size we employed is not sufficient to undertake the Johansen multivariate estimation technique, the short run and the long run parameters are estimated using Engle- Granger error correction method.

The estimated models exhibited that export sector performance is highly vulnerable to environmental shocks like rainfall in both short run and long run equations. The external shocks such as terms of trade deterioration has also been scrutinized to be the fundamental factor in determining the real principal commodity exports of Ethiopia in both short run and long run equations. Similarly, the real effective exchange rate index (REER) has been important variable in most of the equations. Real intermediate imports which is comprised of raw materials, semi finished goods and capital goods has been also found to be key factor for real manufactured exports which is highly import intensive with 87 percent of raw material demands meet from imports. On the other hand, the variable representing the influence of the road network on export supply (TRL) has the expected sign for all the commodities although it is significant only for Chat, Hides Skins and Oilseeds exports. Negative relationship between real exports of Coffee and real exports of Hides and skins has been observed with the exchange rate gap disclosing that when the gap widens export supplies of these commodities will be slumped. Errors and omission, fertilizer sold, domestic consumption, real agricultural production, international trade loan for export are vital variables in determining real export of commodities.

The repercussion of these results is the importance of diversifying the export sector both geographically and commodity wise. The commodity diversification should be also embarked on both horizontally and vertically. The Importance of real effective exchange rate calls up also the real depreciation of the Birr is imperative for competitiveness of all commodities that Ethiopia is exporting for the international markets.

1. Introduction

1.1 Background

The economic growth of Ethiopia has fallen behind other developing countries and the balance of payments worsens continuously during the four decades. These puzzles stem from low development of the exports sector performance of the country which have been falling during the whole of the last four decades due mainly to instability of the export earnings of the country and the dependence of the country on primary commodity exports whose global demand is showing diminishing trends (ADB, 1990, Brown and Tiffen, 1992; Alemayehu, 2002 as cited in Mellese, 2004).

Export performance of the country remains heavily ties to coffee, whose price particularly in recent years has become very much susceptible to exogenous external and international shocks. This weakness has exhibited in the past four decades by the slower export/GDP ratio and the degenerate share of exports earnings in financing import bills. (Birhanu Lakew, 2002)

The commodity concentration index, which measure the diversification of the sector halted at 61.2% between 1970/74 and 2003/04 with out exhibiting a significant change. This high commodity concentration index of the country generates export instability and swayed the economic growth of the country by way of engendering uncertainty in the long term planning and creating shortage of imported inputs which are vital for the production process.
(Kwabena Gyimh, 1991; Birhanu Lakew, 2004; Ethiopian Economic Association, 2004).

Ethiopia obtains most of her capital goods and crucial production inputs from imports that in turn is the outcome of a stable export earnings. Hence, intensification of export earnings instability implies inability to import these inputs or not able to import them at a time when need arise during the production process denoting that export earnings stability will have strong impact on economic growth in Ethiopia.

Similarly, in Ethiopia, since domestic demand is dismal to absorb domestic production, exports provide larger market opportunities and enable to seize advantage of specialization and scale economies. In addition, large share of government revenue to finance development derived from export taxes, which in turn adversely affect the implementation of development plans and completion of development projects.

On the other hand, the Ethiopian economy is characterized by capital immobility, currency in - convertibility and exchange controls. As a result, instability in export earnings is not cushioned by capital flows in the opposite direction. Hence, the lack of capital flows to counter short-term fluctuation in export earnings makes the output of goods and services fluctuate with export earnings. Consequently, since the export instability results in reduction of savings, unless the export earning instability is maneuvered, the already subsistence living standards of the country would be reduced extremely.

Thus, to appreciate the problem of dependency of the country on few primary commodities whose terms of trade[1] are secularly deteriorating in the international market and to obtain the

[1] *Terms of trade can be said to denote the ratio between the values of one commodity bundle in terms of another. The net barter terms of trade defined as the price of exports and the price of imports. If a country's*

determinants of each export items, formulating a formal econometric model has been deemed imperative.

1.2 Statement of the problem and objective of the study

Empirical studies which have been undertaken on Ethiopian export sector focused either at micro level analysis like supply response of one commodity at a time or at high degree of aggregation like macro econometric modeling that have been undertaken on Ethiopian economy taking the external sector at one block which did not disaggregate the sector in to commodity levels. As a result, it has been difficult to see the impacts of domestic policy shocks and/or international shocks like terms of trade deterioration on individual commodities separately. Moreover, these studies did not split up the sector into unprocessed agricultural commodities and processed and semi processed export items. Hence, it is difficult to analyze the impact of exogenous shocks and policy shocks on separate primary commodities and manufactured exports.

Mainstream economists in the international trade based their theories on the assumption of full employment in the economy. However, the stylized facts in Ethiopia revealed that the unemployment rate is high and hence none of the conventional theories from Adam Smith's to Krugman showed the Ethiopian reality. On the other hand, structural economists such as Gebre-Hywot (1921) Prebish (1950) and Singer (1950) have argued that the terms of trade of primary commodities in the international markets are secularly deteriorating vis-à-vis the price of

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export prices have declined relative to the price of the country imports, its terms of trade would be deteriorated. A more relevant objection relating to time trend analysis is that any test on the decline of the terms of trade should be performed in ceteres paribus conditions; that is, the intervening exogenous factors should be accounted for. The major factors whose effect should be extracted from the usual terms of trade measure to obtain a net measure which free of exogenous bias are (i) freight and insurance costs (ii); trade composition; (iii) quality; and (iv) productivity.

manufactured goods. However, whether the source of fluctuation is demand side or supply side has been remained to be an empirical issue. (Sarkar, 1986;Sparos, 982 as cited in Melese, 2004)

On the other hand, Commodity markets differ among commodities in terms of degrees of competitions that prevail among buyers and sellers, the extent of market fragmentation and whether there are closes substitutes in the markets giving rise to different forms of competitions among different commodity markets (Lord, 1989).

The general objective of this study is, therefore, modeling of the principal export commodities of Ethiopia disintegrating the exports of goods sector in to five primary agricultural commodities and manufactured exports. The questions that tend to be solved by this study could be, firstly, to identify the real export determents of each principal commodities of the country and then propose appropriate polices that help to improve the performance of the sector, secondly, to test policy recommendations made by International Financial Institutions like devaluation of currency on the performance of each major commodities and manufactured exports. This helps to assess the competitiveness of the export sector in the international market at a commodity level. Thirdly, to test the trade linkage between the growths in trading partners' most of them are industrial countries and the export growth of Ethiopia, that is, trade as engine of growth hypothesis.

1.3 Hypothesis

The hypotheses of this study are: firstly, the exchange elasticities of commodities differ among different principal commodities and between traditional agricultural and manufactured exports. Secondly, the determinants of the principal export commodities and the manufactured export

items of Ethiopia are different. Thirdly, the theory of trade as engine of growth does not prevail in Ethiopia. Finally, there exists a significant difference between the price and income elasticities of traditional primary commodities and semi- processed manufactured exports of Ethiopia.

1.4 Significance of the study

This study will contribute to the existing research works undergoing in the export sector modeling as it attempted to model the sector at more disaggregated level. Moreover, since studies that have been undertaken in the area of export modeling and commodity modeling did not gave due emphasis to Ethiopian case, this paper tries to fill this gap by modeling the export sector of the country disaggregating in to agricultural and non agricultural sub sectors and within these sectors by modeling each principal commodities to identify the determinants of each commodity.

The paper also abet to policy makers to prioritize their emphasis on the commodities which are sensitive to policy variables and to pinpoint those commodities which contribute more on the economic growth of Ethiopia.

From an academic point of view, this study is important because it employs econometric techniques that have gained considerable currency in recent times, utilizing stationary tests, cointegration analysis and an error correction model. The findings of this study, therefore, will be significant in enhancing the empirical literature on the Ethiopian commodity exports.

1.5 Limitation of the Study

The study intends to model the principal commodities based on the share they have on the total export earning of the country. However, this trend may be changed if the country diversifies the commodities horizontally or vertically. Moreover, the study will model only the exports of goods which is one part of the external block of the economy. Hence, it would not give full pledged insight of the external sector although it would be enough to see the primary commodity export problem of the country.

Another limitation of the study could be since the focus of the study is modeling exports quantities of the principal commodities including the manufactured exports, it would not give due emphasis on the supply response of the commodities.

On the other hand, since Ethiopia is price taker in the international commodity market (small economy), we estimated only the supply side although modeling the demand side of the sector may give insight to policy makers.

Moreover, as the sample size we took is not satisfactory to employ Johansen multivariate approach, we employed the Two Stage Engle-Granger Estimation method. Thus, the estimated results are not free of the drawback of this estimation technique.

1.6 Structure of the study

The paper is organized as follows; next to this introduction trade policies and export performance before and after economic liberalization has been analyzed with comprehensive examination of the market structure of the commodities estimated. The third chapter underlined the empirical literatures and scrutinized the relevance of conventional trade theories on Ethiopian economy. While structure of our model is illustrated in chapter four, estimation results and interpretations are given in chapter five. Conclusions and recommendations of the study have been depicted in chapter six.

2. Trade Policies and the Export Performance in Ethiopia

2.1 Trade Policies During the Pre-reform Period

The new leadership of the Derge regime motivated by the motto of Ethiopia Tikdem, was committing nationalism through out the first half of our sample period. As a result, foreign owned capital was no longer invested in the export sector during the period. Another factor that characterized the foreign economic relations of socialist Ethiopia was the continuation of the import substitution policy. This policy was introduced by the imperial regime in order to combat the trade deficit that has emerged since the 1950s as a consequence of falling export revenues and increasing import expenditure related to imports of finished goods (Gote Hansson, 1997).

On The other hand, trade and exchange rate policy under the Ethiopian Tikdem period was characterized by the imposition of licenses, quantitative restrictions, trade taxes and centralized allocations of foreign exchange at an over valued exchange rate. During the entire period of socialist rule, the Ethiopian currency, the Birr, was pegged to the US dollar in a fixed and constant relationship, 2.07 Birr per USD. From the late 1940s through the early 1990s, the Ethiopian currency, the Birr, remained pegged to the US dollar. During the 1945-71 the exchange rate remained unchanged at 2.5 Birr per USD. It was revalued to 2.35 Birr per USD in December 1971 and then to 2.07 Birr per USD in February 1973 and remained at that level until October 1992. (Gote Hansson, 1997).

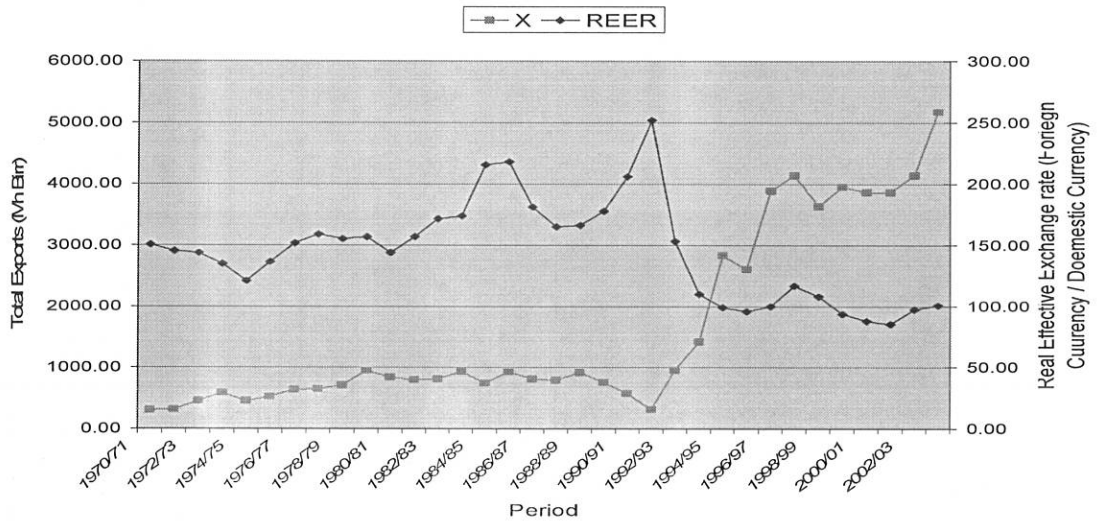
During the 1908s, married with high inflation rate vis-à-vis its major trading partners, domestic currency was considered to be increasingly overvalued. One indicator of such overvaluation, the

difference between the official and parallel market exchange rates, confirms this claim. (See figure 2)

The fixed exchange rate during the period was not only a clear overvaluation of the Ethiopian Birr, the pegging to the US dollar was also inappropriate. The fixed relationship between the Ethiopian Birr and the US dollar was probably due to the pre 1973 international monetary system, where the US dollar was the principal reserve currency whose value was defined and guaranteed in gold. However, since 1973 when the Breton Woods monetary system came to an end, there were no priory motives for a country to relate its currency completely to the US dollar. In Ethiopia context, only a minor share of foreign trade during the Ethiopian Tikdem period was with the USA, where as the trade with European countries was much greater. Export with USA in the per-1991 period varied between 8 and 31 percent (on average 19 percent) while the corresponding variation of exports to Europe was between 24 and 49 percent.

On the other hand, the movements of real effective exchange rate (REER), axis two, showed during the (1974/75 – 1991/92) period, the rate was highly over valued. The natural outcome of this impassive exchange rate policy was the development of an illicit parallel market for foreign exchange where at the time the spread between the two rates reached as high as 230 percent. The over valued official exchange rate coupled with stringent foreign exchange rate rationing, provided fertile ground for illicit cross border trade, particularly in coffee and live animals as a result foreign exchange receipt from the export sector was low (see axis one, Fig 1).

Fig.1 Trends of Total Exports and Real Effective Exchange Rate



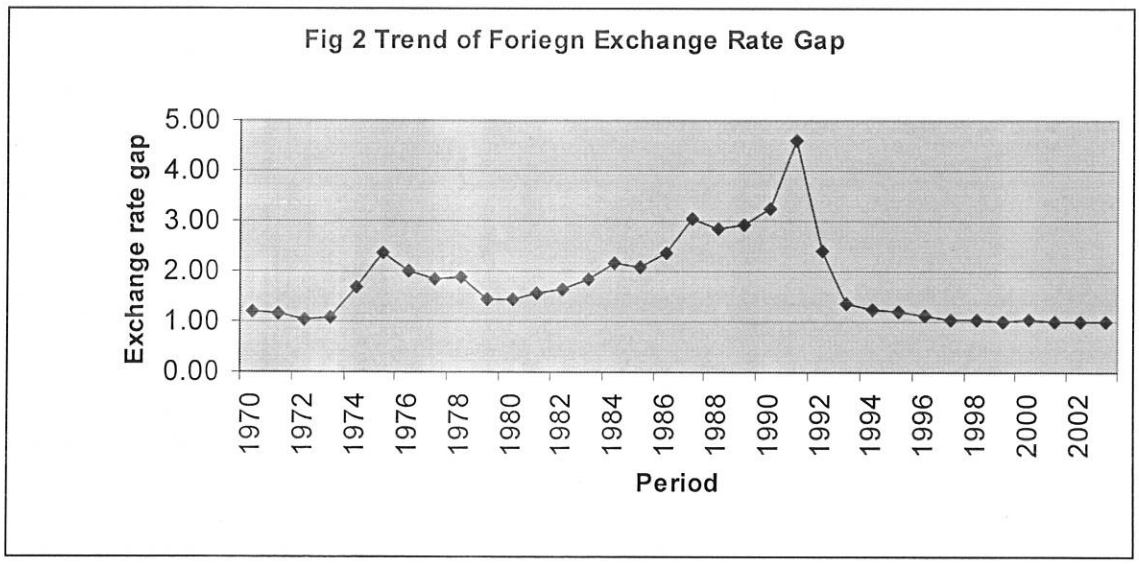
Nonetheless, employing REER, which uses CPI in its formulation for measuring competitiveness of tradable has drawbacks in Ethiopian case since the CPI which is composed of more than 60% from food items incorporated regulated prices. Hence, is presumed that the REER index was over valued than explained by this index. Alternatively, some authors use REER index, which employs GDP deflator to measure competitiveness although decomposing the annual GDP in to quarterly GDP has its own draw back and as a result we compelled to use the former in our estimation.

2.2. Trade Policies during the Post- Reform Period

The new government of Ethiopia sponsored by the international financial institutions, undertaken a comprehensive trade reform programs aimed at dismantling quantitative restriction and gradually reducing the level and dispersion of tariff rates. In line with the trade liberalization of structural Adjustment Programs (SAP), negative list used to determine eligibility for imports through the foreign exchange access was reduced significantly. Currently, quantitative import restrictions are applied only to used closing, harmful drugs, and firearms.

Moreover, as part of the over all reform program of the government, the exchange rate was adjusted from 2.07 USD/ Birr to 5 Birr per USD on 1 October 1992 (a 142 percent devaluation). Following the devaluation, the exchange rate was also allowed to be determined according to demand and supply conditions in the foreign exchange market with less intervention from the National bank of Ethiopia (NBE) to smooth out erratic fluctuations.

The NBE has taken a number of initiatives to improve the functioning of the foreign exchange market with the view to help the exchange rate at realistic levels and to gradually harmonize the official and the parallel foreign exchange markets. These include eliminating foreign exchange rationing; inaugurating a foreign exchange auction in fortnightly and weekly basis, permitting commercial banks to open foreign exchange buries to engage in retail foreign exchange trading (October 1996), and permitting inter -bank foreign exchange trading (Sept 1998), and fully replacement of auction foreign exchange market by daily inter-bank foreign exchange market in Oct 2001. (National Bank of Ethiopia different foreign exchange rate directives)



Source: *NBE Data Base*

Foreign exchange reforms also include the lifting of restrictions on remittances by foreign nationals abolishing restrictions on the amount of foreign currency allowed for overseas medical and business expenses. Currently, foreign currency purchase of up to USD 1200 is permitted for holiday travel. Similarly the National Bank issued a directive which allow exporters to retain up to 10 percent of their foreign exchange receipts in foreign currency deposits and sell the balance to any local bank or foreign exchange bureau at freely negotiated rate over an extended conversion period of four weeks

On the other hand, foreign direct investment was believed to be the leading sector during the current regime to facilitate the export sector. In this regard, investment in the export sector have exemption from income taxes if at least 50 % of the out put is exported or at least 75 % of the out put is sold as input for exporter for a period of 5 years. Similarly, investments in some areas are eligible for duty free imports for capital goods. However, despite all measures taken to promote foreign direct investment and facilitate the export promotion scheme, FDI inflow in Ethiopia is low by Sub- Saharan Africa standard, and more importantly export oriented FDI projects have been remained slant. Of the fifty-nine foreign or joint venture investments that became operational during the period under investigation, few were directed to primary export markets (Ethiopian Economic Association Report 2004). Regarding the import intensity of the FDI companies engaged in the export markets, 87 percent of the raw material demand was met from imports. In this case, the depreciated exchange rate married with the highly inelastic foreign import demand and the associated high import intensity of export manufacturing may leads to fall export revenues.

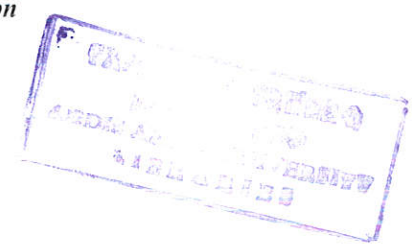
The major constraints that have contributed to the poor performances of exportable producing FDI companies in Ethiopia are: (i) the negative perception of FDI in the country, (ii) the past poor record of the Derge regime policies, (iii) famine image of the country and poor infrastructure. In addition to the above factors which are mostly exogenous, the problem of access to land, availability of land, the variances of regulations among different regions of the country, the affordability issue of land, the inability to pledge land use rights to secure financing, the non existence of intellectual property right, inaccessibility of credit to exporters are the major bottle necks of the sector. (Trade and Integration: Ethiopia, 2004)[2]

2.2.1 Export Promotion Policies in Ethiopia

Following the export led development strategy and outward oriented trade policy, Export Promotion Council (EPC) consisting of high level government officials, exporters, and service providers led by the Prime Minister was set up in 1992 to design, implement and monitor export development policies. Later, in 1999, the Council restructured as the Ethiopian Export Promotion Agency to implement a wide ranging export implement agenda including market research; facilitating participation of exporters in trade fairs, exhibitions and trade missions; and disseminating market information.

During the period under study, initiatives have been undertaken to facilitate private sector participation in the export trade. In this regard, the dismantling of the government monopoly in coffee trade and abolishing mandatory approval requirement for export contracts by the National Bank of Ethiopia (NBE) cab be mentioned as the major reform measures implemented to achieve

[2] *American Consultancy firm on Ethiopian Trade and Integration*



this objective. The introduction of foreign exchange retention scheme that allow exporters to retain part of their foreign exchange proceeds is another measure taken during the period as mentioned in section 2.2. Other measures to assist exporters include a bond manufacturing warehouse scheme and an import duty rebate scheme aimed at providing exporters of manufactured goods to import inputs at world market prices. Exporters of manufactured goods currently relied on an import voucher schemes to obtain duty exemption on imported inputs.

The National Bank of Ethiopia (NBE) has established an Export Credit Guarantee schemes. This scheme aims to encourage banks to provide non-coffee exporters with short-term credit for working capita requirements relating to exporting of all products other than coffee. This policy was designed to cushion banks against the risk of export financing by banks.

On the other hand, the Ministry of Foreign Affairs (MoFA) has taken some initiative to promote Ethiopian exports through its commercial attaches in foreign diplomatic missions. This mission is supposed to undertake gathering information about trade fairs, facilitating trade mission, distributing leaflets, and organizing discussion forums to disseminate genuine information on the opportunities prevailing in the country.

2.2.2 Performance of the Export Manufacturing Sector in Ethiopia

One of the major channels that export contributes to economic growth is through the manufacturing export industries. This effect on other industries will depend on two factors: the extent to which the export industries penetrate the rest of the economy, and the rate of technological progress in the export sector relative to that of the remaining sectors. If exports are produced by industries that form an enclave in the economy and are only barely related to other

sectors, then even a very fast rate of export growth will hardly affect the other sectors. On the other hand, if exports do not manifest a higher technological change, which is both pure technological change and economies of scale, then there would no special advantage in developing exports rather than other industries.

Notwithstanding the adverse terms of trade and problems associated with lack of diversification, it has been the policy preference of all regimes in Ethiopia to rely on the export of raw agricultural products to meet foreign exchange demand rather than encourage manufactured exports or even semi-processed commodities. As result, manufactured exports remained of secondary importance in the country

On average, the share of manufactured exports to total exports remained less than 10% during the last three decades. The extreme small proportion of firms in export trade indicates that policy makers have never taken manufactured export as strategy for foreign exchange earning nor producers of these items as means of developing technology capacity. (Ethiopian Economic Association, 2004)

Moreover, the export intensity[3] is also very low implying that these firms are not exporting even half of their out put. The Ethiopian manufacturing sector is predominantly domestic market oriented. For instance, about 95% of total manufacturing export comes only from four industries, namely, leather and tanning, sugar, Textile and spice processing. Leather-tanning alone accounts for nearly 70% of manufactured exports. (CSA, different issues).

[3] Export as the proportion of production level

2.3 Overview of Exports Performance and Market Structure of the Principal Export Commodities

During 1970/71-1973/74 (the Imperial regime), the quantities of the principal export commodities showed a variability trend. However, on average, the growth rates of the export volumes of Coffee, Oil Seeds, Hides & Skins and Pulses increased marginally due to the international commodity price shock and the collapse of international monetary system. In addition, the negative growth rate of Chat during the period could be to the fact that the exports of Chat did not obtain appreciation as a strategic export item.

On the other hand, during 1974/75-1990/91, the growth rates of the quantities of coffee export exhibited a slightly positive development with fluctuating growth pattern. The negative growth rates that observed in some years could be associated with drought of 1984/85, the political instability, the impassive exchange rate policy. The development of an illicit parallel market foreign exchange (the spread between the two rates reached as high as 230 percent) and as a result the over valued official exchange rate coupled with stringent foreign exchange rate rationing provided fertile ground for illicit cross border trade, particularly in coffee and live animals. Over all, during the period, Coffee, Chat and Hides & Skins showed average marginal positive growth rates while Pulses and Oil Seeds affected by the intensified drought of the 1984/85 more than the perennial crops showed negative growths.

During the third period (1991/92-2004/05), all the principal commodities displayed positive developments although there are some fluctuations with in the period. The negative growth rates of the entire principal export items during 1992/93 pointed out that political instability affected

the performance of the export sector significantly. On the other hand, during 1996/97 and 1996/97, emanated from good whether condition, all commodities showed positive growth rates and these are the years that Ethiopia enjoyed the highest foreign exchange earnings from export sector before 2002/03 and 2003/04.

Overall, during 1991/92 to 2004/05, the export sector has showed recovery as manifested by all the positive quantity growth rates of the principal export commodities. (See Table 1)

In addition to the good weather prevailed during the period under study, the following measures can be considered as the major factor for the improvements of the export performance:

(i) Foreign exchange reforms which includes the lifting of restrictions on remittances by foreign nationals and lifting of restrictions on the amount of foreign currency allowed for overseas medical and business expenses

(ii) The introduction of foreign exchange retention scheme that allows exporters to retain up to 10 percent of their foreign exchange receipts in foreign currency deposits and sell the balance to any local bank

(iii) Export promotion policies such as market research; facilitating participation of exporters in trade fairs, exhibitions and trade missions; and disseminating market information.

(iv) The dismantling of the government monopoly in coffee trade and abolishing mandatory approval requirement for export contracts by the National Bank of Ethiopia

(v) A bond manufacturing warehouse scheme and an import duty rebate scheme aimed at providing exporters of manufactured goods imported inputs at world market prices

(vi) An Export Credit Guarantee schemes which encourage banks to provide non-coffee exporters with short-term credit for working capita requirements relating to exporting of all products other than coffee to cushion banks against the risk of export financing by banks

Table 1: The Average Growth Rates of the Quantities of the Principal Export Commodities

Period	Coffee	Oil Seeds	Hides & Skins	Pulses	Chat
1970/71-1973/74	2.81	31.30	12.77	40.00	-1.49
1974/75-1990/91	3.24	-0.40	5.31	-0.32	36.73
1991/92	-44.62	-93.12	-35.05	-90.53	-82.91
1992/93	108.92	122.73	51.62	9.23	671.47
1993/94	2.65	2498.98	40.07	544.40	45.04
1994/95	18.85	19.09	7.42	162.02	45.03
1995/96	18.71	-35.45	-10.01	12.36	-9.21
1996/97	26.22	79.64	14.60	5.18	36.04
1997/98	-2.53	373.04	-9.21	1.45	18.88
1998/99	-15.67	-22.82	-25.82	-3.48	62.22
1999/00	15.14	-16.03	47.72	-21.14	61.65
2000/01	-14.95	27.64	44.23	14.17	-23.95
2001/02	11.31	39.15	-16.72	306.64	-21.39
2002/03	14.30	8.09	2.04	-39.43	-34.89
2003/04	24.01	27.95	-10.84	10.77	147.90
2004/05	2.97	32.84	63.83	66.01	28.35
1991/92-2004/05	11.81	218.69	11.71	69.83	67.45
1970/71-2004/05	6.73	92.61	8.60	32.12	46.00

Source: *Compiled from the National Bank of Ethiopia Data Base*

As clearly depicted in Table 2 and Fig.3, Coffee has been remained the dominant export commodity in Ethiopia for more than three decades. The lowest share of coffee is observed during 1974/75 (25%) perhaps as a result of political instability, which arose due to change of government and the commodity price shocks of the early 1970s. The highest values were recorded on the other hand, during 1978/79 to 1979/80 due to low production in the global coffee market associated with the Brazilian forests and the strong external demand due to high economic growth and accelerated inflation in industrial countries (FAO; 1970-71, 1974-75). Moreover, the international monetary uncertainty due to double digit inflation rate in most developed countries led to the movements of liquid funds from monetary assets to commodities (FAO, 1973, 74 as cited in Melese, 2004) has contributed to the upward movement of coffee price in the international market and the associated rise in the share of Ethiopian coffee export in the international market.

The industrial world recession, which occurred in 1980-81, curbed demand for agricultural commodities and has depressed coffee prices down. During this period the prices of coffee in the international markets declined from 169.5 US cents per pound in 1979 to 115.5 US cents per pound in 1981(FAO, 1982, 1983). This had significant impact on the exports of Ethiopian coffee. Consequently, the share of coffee declined during this period from 62.5% in 1980/81 to 47.5 % in 1981/82.

The Occurrence of frost in Brazil again in 1981, drought in 1985, the reintroduction of International Coffee agreement (ICA) and the recovery in industrial economies in 1983 helped the price of coffee to recouped again during 1982-86 and this led the share of Ethiopian coffee rose from 1981/82-1988/89 (Fig. 1 and Table 2)

From 1988/89 - 1990/91, the share of exports of coffee paraded a negative trend due to precipitated decline in the price of coffee in the international market as a result of the revitalization of the supply of coffee and the malfunction of International Coffee Organization (ICA) in 1989 to concur on market shares and quota restrictions (FAO, 1990-91). The decline in the demand of coffee related with world economic conditions in the early 1990s contributed to the declining international coffee price and the associated decline in the share of exports of Ethiopian coffee.

Showing a persistent increasing trend from 1993/94 to 1997/98 due mainly to good weather condition in Ethiopia and the mid 1994 Brazilian forest and the recovery of world economic conditions during 1993-95, the trend altered again and the performance of exports of coffee illustrated a deteriorating drift during 1998/99 -2001/02. The prolonged world production of coffee, the limited world demand in a number of developed countries as the per capita consumption approached saturation could be attributed to the ever lowest record level of prices of coffee in this period (FAO, 1998-99).

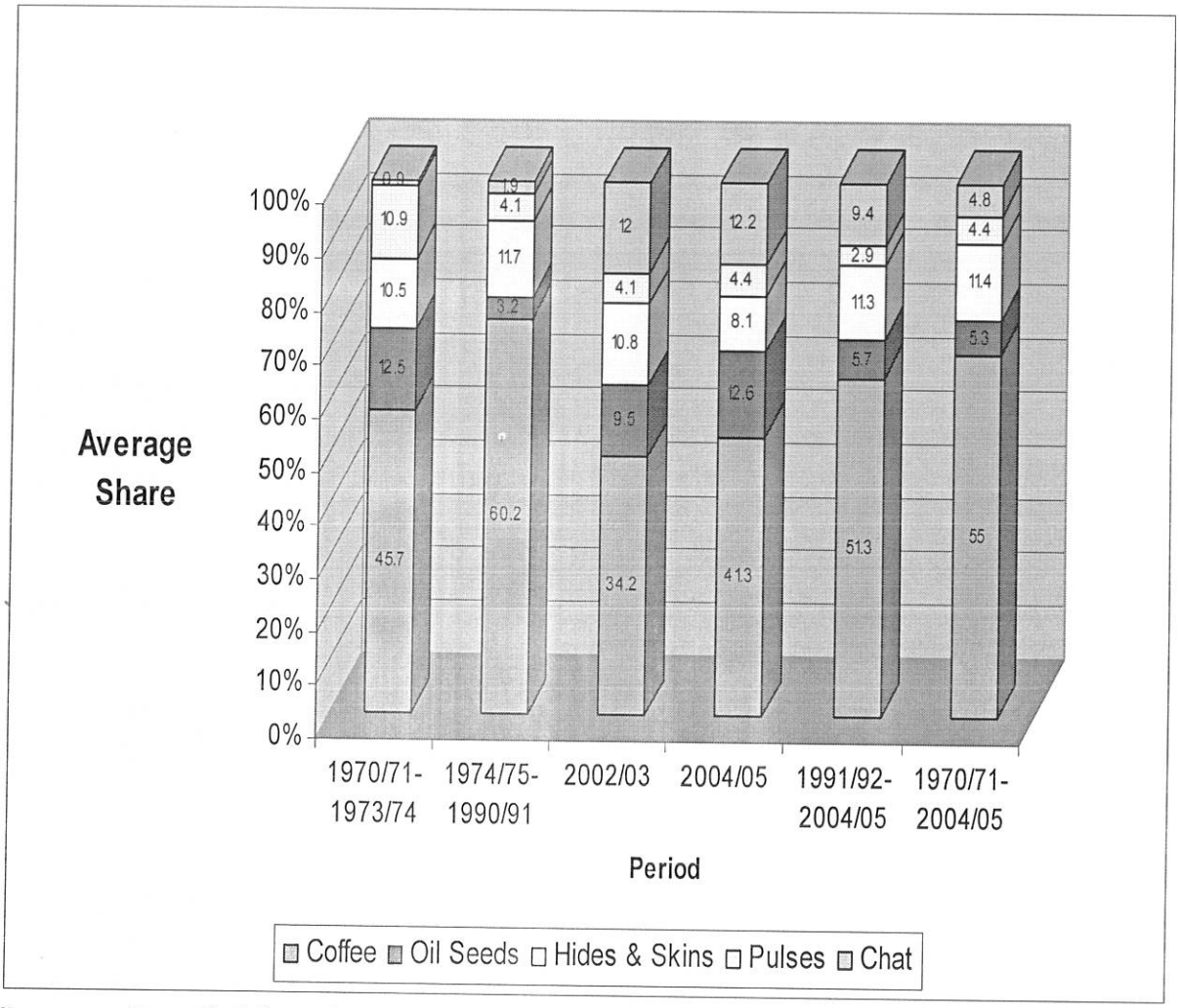
On the other hand, the decreasing of world supply of coffee and the subsequent recovery of international coffee price led to the improvements of coffee performance.

In short, the share of coffee has showed some fluctuating patterns due to mainly its price fluctuates in the international markets, the global production situations in Brazil and economic activity in the trading partners of Ethiopian. When there is good news of whether conditions in Brazil prices will go down and share of coffee will be affected accordingly. On the other hand,

when there is a forest in Brazil, prices will go up and the share of Ethiopia for exports from stocks will increase at least in the short run.

Hides and Skins has been remained the second important export commodity in Ethiopia through out the period considered except in some years in which it has been taken over by Pulses and Oilseeds. During 1972/73-1975/76 and very recently in 1997/98 to 2004/05 where Hides and Skins has chased by Chat, Oilseeds and Pulses owing to the rise of prices of the later and drop of the former.

Fig.3: Average Shares of the Principal Export Commodities of Ethiopia



Source: *Compiled from the National Bank of Ethiopia Data Base*

As shown in Figure 3, and Table 2, during 2002/03 and 2004/05, the relative importance of coffee in the total export revenues has declined respectively by 34 % and 41 % below the overall average share of 55 %. This is largely due to the deteriorating terms of trade of coffee in the world market since 1998. On the other hand, the relative share of chat has increased considerably from below 1 % in 1970's to more than 12% in 2004/05. However, the share of Hides and Skins, Oilseeds and Pulses grew only very modestly during 1970/71-2004/05.

Table 2: The Average Share of the Principal Export Items

Period	Coffee	Oil Seeds	Hides & Skins	Pulses	Chat	Others
1970/71-1973/74)	45.7	12.5	10.5	10.9	0.9	19.5
1974/75/-1990/91	60.2	3.2	11.7	4.1	1.9	12.1
1991/92	52.9	0.1	18.4	0.1	1.6	26.9
1992/93	56.6	0.1	14.2	0.4	6.9	21.8
1993/94	50.6	3.1	14.3	2	7.6	22.4
1994/95	63.5	1.8	13.2	3.6	6.1	11.8
1995/96	66.1	1.6	11.9	3	6.7	10.7
1996/97	59.3	1.9	9.6	2.3	5.1	21.8
1997/98	69.8	7.6	8.4	2.5	6.6	5.1
1998/99	58.1	7.5	6.7	2.8	12.2	12.7
1999/00	53.9	6.5	7.2	2	15.6	14.8
2000/01	39.3	7	16.4	1.9	13.2	22.2
2001/02	36.1	7.2	12.3	7.3	10.8	26.3
2002/03	34.2	9.5	10.8	4.1	12	29.4
2003/04	37.2	13.8	7.3	3.8	14.7	23.2
2004/05	41.3	12.6	8.1	4.4	12.2	21.4
1991/92-2004/05	51.3	5.7	11.3	2.9	9.4	19.4
1970/71-2004/05	55	5.3	11.4	4.4	4.8	19.1

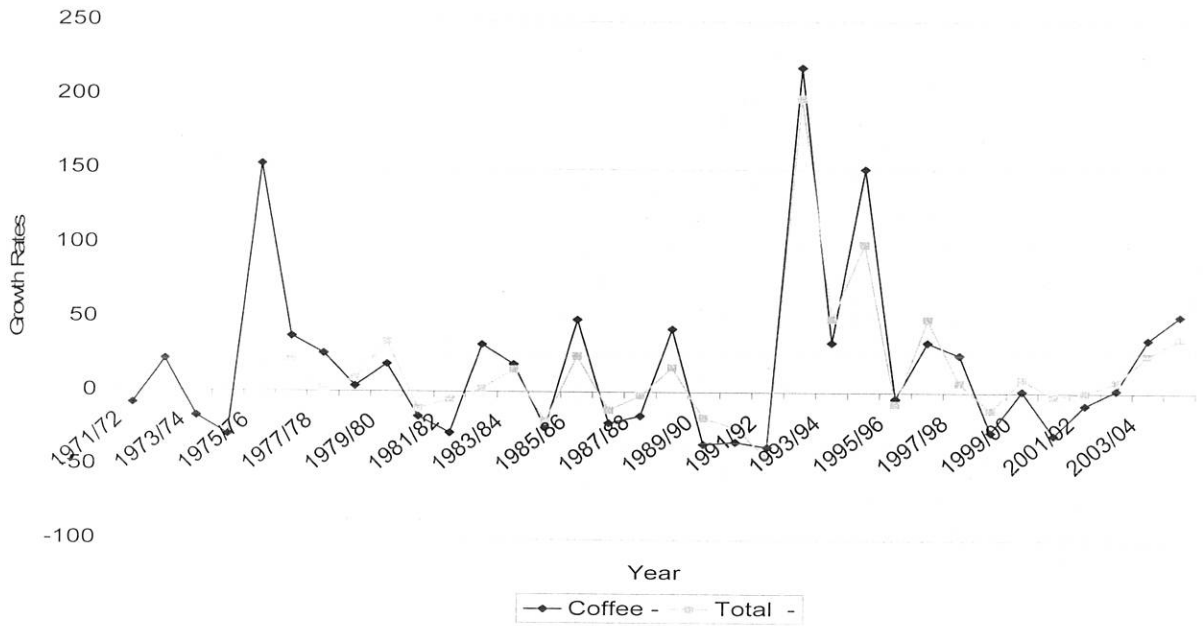
Source Author's compilation from NBE's Annual and Quarterly Bulletins

On the other hand, the growth rate of the total export track the growth rate of coffee export except in some years such as 1975/76, and 1994/95. However, since, on average, during 1970/71-2004/05 the share of coffee has remained sizeable (55%), the track is not surprising. More over, there has been observed a clear structural break in 1975/76 and 1992/93 due mainly to change of governments and the accompanying policy changes. (See Fig. 4)

The highest growth rate of the values of coffee export observed during 1975/76 possibly due to the increase in the supply of coffee as the volume of coffee during this period increased by 57%. Average growth rate in the international coffee export price has also contributed for the good performance of coffee during this period. On the contrary, values of exports of coffee and total export value pursued an almost stagnation growth during 1980/81-1988/89 following the fall in the international price of coffee export and a rise in world coffee supply by an average annual rate of 2.6%. (Melese Minale, 2004)

The period 1989/90-1991/92 was the worst period for the Ethiopia's export earnings from coffee export. The lowest growth rate in the sample period (37%) was recorded during 1991/92. This was the result of the slump in the international price of coffee and a fall in volume of coffee export by an annual average rate of 27.5% following the domestic political instability and regime change. This was followed by another grace period for coffee export mounting an average growth rate of 76.4% per annum following a recovery in both international price of coffee and export supply of coffee due to peace restoration. By the same taken, the deterioration of the international price of coffee has caused the export earnings of coffee to fall by an average rate of 15.7% per annum during 1998/99-2001/02. Finally the values of export of coffee recovered during 2002/03-2004/05 growing annually on average by 29.7%. The 29.7% increase could be explained by 13.7% per annum volume growth rates of coffee export during 2002/03-2004/05. (See Table 3)

Fig. 4: Growth Rates of the Values of coffee and Total Exports Values



Source National Bank of Ethiopia Data Base

During 1970/71-1973/74, on average, a 1.3% decline in the value coffee export had a 0.6 % contribution to the 25.5% total export growth. Similarly, a 44.6%, 44.8%, 88.6% and 32.4% growth rates of Oil Seeds, Hides & skins, Pulses and Chat had respectively a 5.6%, 4.7%, 9.7% and 0.3% contribution to the 25.5% growth of total exports.(See Table 3 and Table 4)

On the other hand, while a 10.3%, 8.1%, 53.6% growth rates of Coffee, Hides and Skins and Chat had played respectively 6.2%, 0.9%, and 1.0% positive contribution for the 1.3% marginal growth rates of the total export earnings during the pre-reform period, the 5.0% and 2.2% decline in the growth of Oilseeds and Pulses had 0.2% and 0.1 share to the 1.3% growth of total export.

Table. 3: The Average Growth rates of the Export Values of the Principal Exports Commodities

Period	Coffee	Oil Seeds	Hides & Skins	Pulses	Chat	Total Exports
1970/71-1973/74	-1.3	44.6	44.8	88.6	32.4	25.5
1990/1990/91	10.3	-5.0	8.1	-2.2	53.6	1.3

Period	Coffee	Oil Seeds	Hides & Skins	Pulses	Chat	Total Exports
1991/92	-37.3	-89.5	-36.4	-97.5	-75.2	-44.3
1992/93	219.0	209.7	129.4	949.2	1195.6	198.1
1993/94	33.7	3625.7	51.4	584.0	64.2	49.5
1994/95	150.6	13.4	83.5	272.8	59.7	99.7
1995/96	-4.2	-16.3	-17.1	-25.2	1.2	-8.0
1996/97	33.8	77.0	20.2	13.8	14.4	49.3
1997/98	25.2	323.8	-6.6	17.2	36.5	6.4
1998/99	-26.9	-13.7	-30.1	-1.3	63.4	-12.2
1999/00	1.0	-5.9	17.9	-21.3	39.1	8.8
2000/01	-28.8	5.6	121.2	-9.0	-17.5	-2.3
2001/02	-8.3	3.4	-25.1	286.6	-18.0	-0.1
2002/03	1.8	41.9	-5.6	-39.1	18.9	7.2
2003/04	35.8	80.2	-16.1	13.7	52.4	25.0
2004/05	51.7	25.1	52.5	58.4	14.0	36.7
1991/92-2004/05	31.9	305.7	24.2	143.0	103.5	29.6
1970/71-2004/05	18.2	127.3	18.0	65.6	72.3	15.1

Source National Bank of Ethiopia Data Base

As Table 3 and Table 4 illustrated, during 1970/71-1973/74, on average, a 1.3% decline in the value coffee export had a 0.6 % contribution to the 25.5% total export growth. Similarly, a 44.6%, 44.8%, 88.6% and 32.4% growth rates of Oil Seeds, Hides & skins, Pulses and Chat had respectively a 5.6%, 4.7%, 9.7% and 0.3% contribution to the 25.5% growth of total exports.

By the same token, after the comprehensive macro- economic liberalization has been under went during 1992/93, the development of the principal export commodities to the growth contribution of total export of the country showed that the commodities considered had positive contributions to the observed growth during the period. For instance, from the 29.6% total export growth, the 31.9%, 305.7%, 4.21%, 43.0% and 103.5% growths of Coffee Oil Seeds Hides & Skins, Pulses and chat had respectively 16.4 %, 17.4%, 2.7%, 4.1% and 9.7% contributions.

Overall, during the whole period considered, the 18.2%, 127.3 %, 18.0%, 65.6 % and 72.3% growth rates of Coffee Oil Seeds Hides & Skins, Pulses and chat had 10.0%, 6.7%, 2.0 %, 2.9% and 3.5% contributions to the 15.1% growth rate in the value of total exports.

Table. 4: Growth Contributions of the Principal Export Items to Total Export

Period	Growth contributions				
	Coffee	Oil Seeds	Hides & Skins	Pulses	Chat
1970/71-1973/74	-0.6	5.6	4.7	9.7	0.3
1974/75-1990/91	6.2	-0.2	0.9	-0.1	1.0
1991/92	-19.7	-0.1	-6.7	-0.1	-1.2
1992/93	124.0	0.2	18.4	3.8	82.5
2000/01	-11.3	0.4	19.9	-0.2	-2.3
2001/02	-3.0	0.2	-3.1	20.9	-1.9
2002/03	0.6	4.0	-0.6	-1.6	2.3
2003/04	13.3	11.1	-1.2	0.5	7.7
2004/05	21.4	3.2	4.3	2.6	1.7
1991/92-2004/05	16.4	17.4	2.7	4.1	9.7
1970/71-2004/05	10.0	6.7	2.0	2.9	3.5

Source National Bank of Ethiopia Data Base

By the same development, despite the fact that Ethiopia had obtained an opportunity from European Union, Every Thing But Arms (EBA) during 1992-2005, the share of Europe for Ethiopian exports has showed a declining trend from 50.3% during 1989-1992 to 4.68% during 1992-2005. As the share of the major trading partners in the continent such as Germany, Italy, United Kingdom and the Holland did not show significant change in the two regimes, the decrease in the share of Russia during the post reform period can be attributed to the decline of the share of Europe.

Moreover, unlike in the case of Africa where there is emergence of new markets during the post reform period, there has not been observed any apparent emergence new of market in the European continent. (See Table 5)

Conversely, while the share of USA increased vis-à-vis other countries in the continent, the share of Cuba decreased perhaps due to ideological differences of the two countries. The share of other American Countries such as Brazil and Canada showed a marginal increase in the post reform period compared against the pre- reform period.

Since the aggregate market structure analysis of the export sector would not acquaint with the countries and/or continents, we tried to avoid this limitation by analyzing the data at country versus commodity level. However, as Ethiopian Customs Authority began collecting the data in organized form since January 1996 we forced to focus on market configuration of the selected commodities during this period only.

Table 5: Direction of Export Trade in Selected Countries

Country	Average Share			
	(1989-1992)		(1993-2005)	
	WRTR[4]	WRTW[5]	WRTR	WRTW
Djibouti	90.62	7.27	66.13	11.08
Kenya	4.07	0.28	2.51	0.34
Sudan	1.17	0.09	4.50	0.67
Africa, Total	**100.00**	**7.92**	**100.00**	**16.50**
Belgium	6.01	3.09	5.88	2.67
France	9.59	4.83	8.51	3.48
Germany	38.62	19.94	39.65	18.66
Italy	13.86	6.84	15.57	6.96
Holand	5.78	3.02	3.82	1.74
United Kingdom	13.39	6.04	7.25	3.12
Russia	6.19	3.36	0.14	0.06
Total Europe,	**100.00**	**50.33**	**100.00**	**44.68**
Canada	9.94	0.66	7.84	0.51
Cuba	4.78	0.65	0.12	0.01
USA	84.71	8.47	89.46	5.86
Total America	**100.00**	**9.84**	**100.00**	**6.53**
China, Mainland	0.25	0.09	3.53	1.20
India	0.00	0.00	3.22	1.06
Israel	0.24	0.07	4.29	1.37
Japan	55.88	17.45	35.52	10.66
Saudi Arabia	35.66	11.50	25.05	7.48
Yemen	1.71	0.56	6.22	2.15
Total Asia,	**100.00**	**31.57**	**100.00**	**31.70**
Australia	25.11	0.05	0.64	0.20
Grand Total		**100.00**		**100.00**

Source National Bank of Ethiopia Data Base

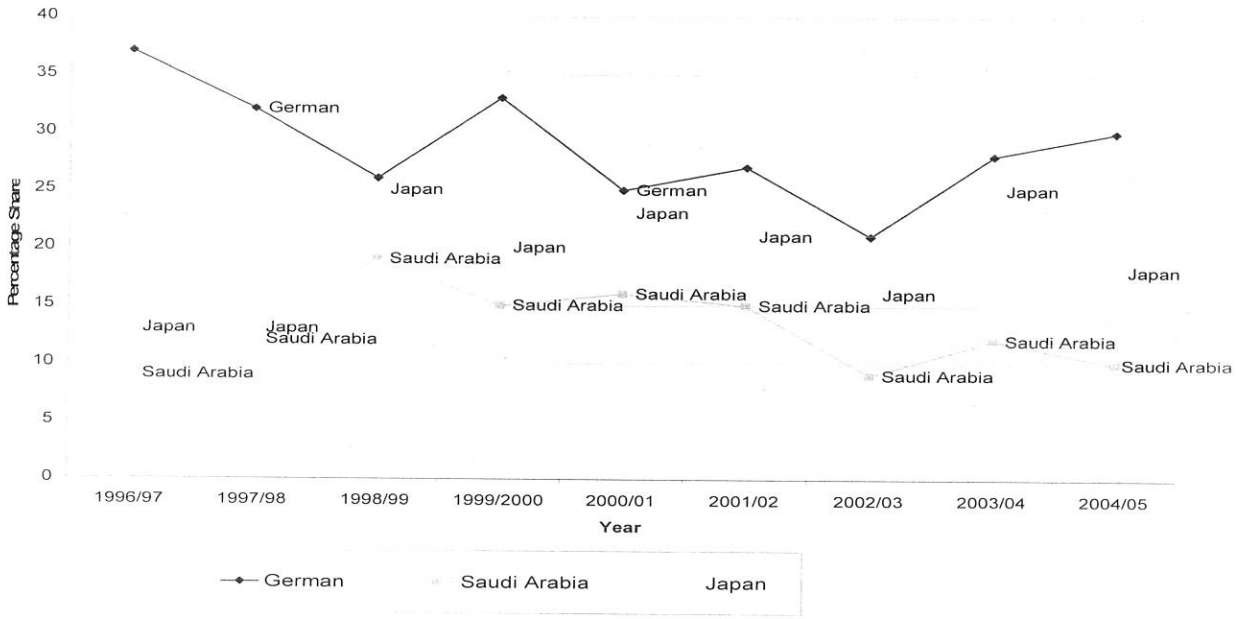
As depicted in Table 4, Table 5 and Fig.4, Germany is the leading destination of Ethiopian exports ofgoods in general and exports coffee in particular. However, as clearly shown in Fig 3, the share of Germany for the destination coffee showed a declining trend. This may arise due to

[4] *WRTR refers to the average percentage share Ethiopia's export for the country with respect the total exports of Ethiopia for the region. For instance, WRTR of Djibouti which is 90.62 % refers the average percentage share of Djibouti 's import of Ethiopian commodities during the period with respect to African total*

[5] *WRTW indicates the average share of the imports the countries of Ethiopian Commodities with respect to the world's import of Ethiopian commodities.*

the existence of new markets following EBA and AGOA opportunities. Italy and France are the major markets coffee next to Germany in the continent.

Fig.5: Share of Selected Countries for the Destination of Ethiopian Coffee



Source National Bank of Ethiopia Data Base

The total share of the four leading importers of coffee has designated a constant pattern indicating that the high geographic concentration index of the country's total export is also observed in the coffee export. The share of the four coffee importing countries showed the lowest level during 2002/03 due to the fact that during this time the share of Germany, Japan and Saudi declined while the share of other countries whose share was insignificant individually increased from 29 % in 2001/02 to 43% in 2002/03.

Table 6: Market Structure of Coffee Exports (1996/97-2004/05)

1996/97	Share	1997/98	Share	1998/99	Share	1999/00	Share
Germany	37	Germany	32	Germany	26	Germany	33
USA	18	Japan	13	Japan	25	Japan	20
Japan	13	USA	12	Saudi. A	19	Saudi. A	15
Saudi. A	9	Saudi. A	12	France	7	Italy	6
Others	33	Others	31	Others	24	Others	26
Total Share	77	Total Share	69	Total Share	76	Total Share	74

Table 6 (Cont'd) Market Structure of Coffee Exports (1996/97-2004/05)

2000/01	Share	2001/02	Share	2002/03	Share	2003/04	Share	2004/05	Share
Germany	25	Germany	27	Germa n	21	Germa n	28	Germany	30
Japan	23	Japan	21	Japan	16	Japan	25	Japan	18
Saudi. A	16	Saudi. A	15	Saudi. A	11	Saudi. A	12	Saudi. A	10
Djibouti	9	France	8	Saudi. A	9	Belgiu m	7	United States	7
Others	27		29		43		28		34
Others	27		29		43		28		34

Source *Authors compilation from ECA data*

Although its share has revealed a declining trend during the period under consideration (See Table 7), the share of Italy for the exports of Hides and Skins is very high being on average more than 50% implying that the Ethiopian Hides and Skins export is highly concentrated with in a single economy and rendering market risks to the export demand of the commodity. Italy's GDP growth has remained stable at 4 % but its total import growth rate showed some fluctuations growing on average by 6 %.(IFS, March 2006). However, the exports of Hides and skins to Italy exhibited a continuously dropping down drift indicating that the demand for Hides and Skins is income inelastic with respect to this country. Great Britain is the second important market for

Ethiopia's Hides and Skins. As depicted in Table 7, the shares of Malaysia, Japan Honk Kong, India, China, Djibouti and Indonesia have fluctuated during the years considered.

On average, the total shares of the four most important markets of Ethiopia for Hides and Skins is higher compared with coffee entailing that the former is more vulnerable than the later with respect to income shocks.

On a continent wise analysis, Europe is the most important market for Ethiopian Hides and Skins and Asia seized the second position next to Europe. The share of Africa and America is almost non-existent with respect to this commodity.

Table 7: Market Structure of Exports of Hides and Skins (1996/97-2004/05)

Italy	53	Italy	67	Italy	63	Italy	57
Great Britain	14	Great Britain	11	Great Britain	13	Hong Kong	10
Malaysia	8	Malaysia	4	Hong Kong	6	Great Britain	9
Japan	8	Japan	3	Indonesia	5	India	7
Others	17		15		13		17
Total Share	83		85		87		83

Table 7 (Cont'd): Market Structures of Exports of Hides and Skins (1996/97-2004/05)

2000/01	Share	2001/02	Share	2002/03	Share	2003/04	Share	2004/05	Share
Italy	45	Italy	56	Italy	52	Italy	37	Italy	35
India	19	Great.B	10	Hong Kong	13	China	21	China	23
Djibouti	8	India	9	Great.B	8	Hong Kong	15	Hong Kong	16
Great B	6	Hong Kong	9	China	7	Great.B	7	Great.B	5
Others	22		16		20		20		21
Total Share	78		84		80		80		79

Source Authors compilation from ECA data

On the other hand, unlike the Coffee and Hides and Skins markets, market of Oil seeds demonstrated some diversifications over time. For example, during 1997/98, the shares of continents regarding imports Oil seeds were Asia (40%), Africa (29%), Europe (25%) and America (7%). During 2004/05 this trend has showed some fluctuation and the share changed to Asia (55%), Europe (23) America (16%), and Africa (6%). While Asia has been remained the main stay of Oilseeds Exports, the share of Africa has been declined drastically from 29% in 1997/98 to 6% in 2004/05. The decline in the share of Egypt from 28 % in 1997/98 to 2% contributed to the loss in share of African.

On the other hand, as illustrated in Fig.4, the average share of the four leading importers of Oilseeds has declined from 83% in the second half of 1996/97 to 50% in 2004/05.This shades some light on the geographic diversification of the commodity.

Table 8 : Market Structure of Oilseeds Exports (1996/97-2004/05)

1996/97[4]	Share	1997/98	Share	1998/99	Share	1999/00	Share
Italy	27	Egypt	28	Egypt	36	Egypt	32
Great Britain	23	Jordan	20	Israel	20	Israel	28
Malaysia	20	Greece	12	United States	11	USA	23
Japan	13	Switzerland	10	Japan	8	Holand	8
Others	17		30		25		9
Total Share	83		70		75		91

Source *Authors compilation from ECA data*

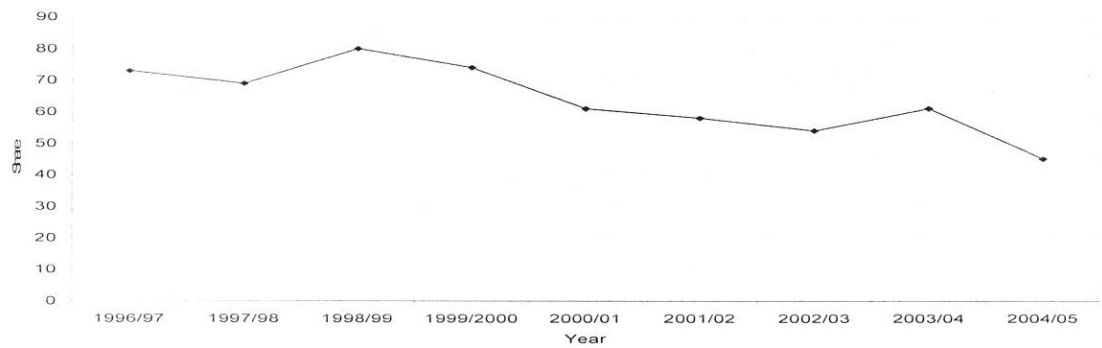
Table 8 (Cont'd): Market Structure of Oilseeds Exports (1996/97-2004/05)

2000/01	Share	2001/02	Share	2002/03	Share	2003/04	Share	2004/05[5]	Share
Israel	29	United States	24	United States	18	Israel	18	China	16
USA	19	Israel	23	Israel	18	Turkey	16	Israel	14
Yemen	10	Egypt	10	Turkey	14	United States	15	United States	12
Djibouti	8	Yemen	9	Yemen	9	Yemen	9	Turkey	8
Others	24		34		41		42		20
Total	66		66		59		58		50

Source *Authors compilation from ECA data*

United Germany is the single most country out of the four leading pulses importers from Ethiopia since 1996/97 to 2002/03. From 2002/03 onwards, Germany has been taken over by Sudan. Holland, Algeria and Yemen.

Fig.6: Total Share of the four Leading Importers of Pulses from Ethiopia



Source *Authors compilation from ECA data*

Table 9: Market Structure of Exports of Pulses (1996/97-2004/05)

1996/97[4]	Share	1997/98	Share	1998/99	Share	1999/00	Share
Rwanda	28	Algeria	34	Algeria	36	Yemen	23
Switzerland	25	United Germany	15	Holland	18	Holland	22
United Germany	13	Switzerland	11	Yemen	13	United Germany	15
Lebanon	7	Holland	9	Germany	13	Algeria	14
Total	73		69		80		74
Others	27		31		20		26

Table 9 (Cont'd) Market Structures of Exports of Pulses (1996/97-2004/05)

2000/01	Share	2001/02	Share	2002/03	Share	2003/04	Share	2004/05	Share
Yemen	20	Pakistan	29	Pakistan	16	Sudan	27	Sudan	26
United Germany	20	India	18	Sudan	14	Holland	13	Yemen	7
Holland	12	Holland	6	India	14	Yemen	13	Holland	6
Morocco	9	Great Britain	5	Yemen	10	Great Britain	8	Pakistan	6
Others	39		42		46		39		55
Total	61		58		54		61		45

The Market structure of Chat is very distinct compared against other commodities exported in that the lion's is exported to Djibouti and Somalia. The share of Djibouti was more than 98 % in 1996/97 while in 2004/05 its share declined taken over by Somali where its share rose from 2% in 1996/97 to 18% in 2004/05. On the other hand, although imports Chat is forbidden in USA, ECA

1996/97 to 18% in 2004/05. On the other hand, although imports Chat is forbidden in USA, ECA data show chat is exported to USA. This is presumably the misclassification of the item by the Office. ECA classified Chat under Harmonized System of Code 14049000. However, this code may include other vegetable products. As result, data coders and encoders may record these items as chat mistakenly

United Kingdom is the third important market for of Ethiopian Chat exports with average of 4.5% during 1996/97-2004/05. Australia, Saudi Arabia, and Kenya are market places of Ethiopian Chat although their combined share is insignificant compared with the share of Djibouti and Somalia.

Table 10 : Market Structure of Chat Exports (1996/97-2004/05)

1996/97[6]	Share	1997/98	Share	1998/99	Share	1999/00	Share
Djibouti	98.67	Djibouti	93.64	Djibouti	63.58	Djibouti	79
United States	1.21	Great Britain	6.11	Somalia	34.08	Somalia	17
Australia	0.05	United States	0.16	Great Britain	1.93	Great Britain	3
Great Britain	0.04	Australia	0.03	United States	0.27	United States	1
Others	0.03		0.06		0.26		0.00
Total Share	99.97		99.94		99.86		100

[6] *During the second half of the year*

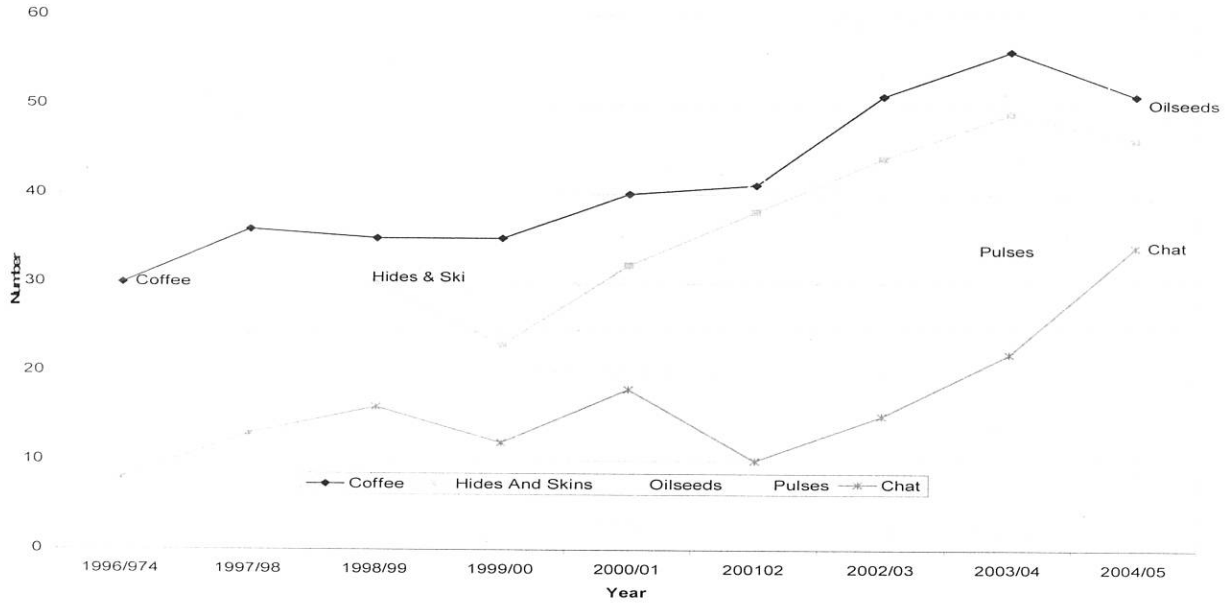
Out of the principal export commodities, coffee has diversified market structure and the number of countries that import coffee from Ethiopia has been increasing continuously since 1996/97 to 2003/04.

During 1997/98 when ECA started recording annual commodity by country export data, the numbers of countries that import coffee from Ethiopia were about 35. This number has grown continuously through out the period we considered and reached more than 55 in 2003/04. This has implication on the demand of Ethiopian coffee implying that the demand is naturally growing perhaps due to the organic ness of Ethiopian coffee which has getting recognition trough time by different countries.

Hides and Skins is the second commodity in terms of market diversification except in some years when it has been taken over by Oil seeds and Pulses.

On the other hand, Chat export has the lowest market diversification as the commodity is banned in some developed countries. The exports of chat is observed in United Kingdom and Australia where it is exported officially and sold openly . On average, during 1996/97-2004/05, more than 77% of chat was exported to Djibouti. Similarly, the share of Somalia for chat import from Ethiopia has been increasing over time and reached annual average share of 24%. Kenya has currently emerged as important chat market and its share reached around 4% in 2004/05.

Fig. 7 : Number of Countries Importing the Principal Export Commodities of Ethiopia



Source: ***Author's compilation***

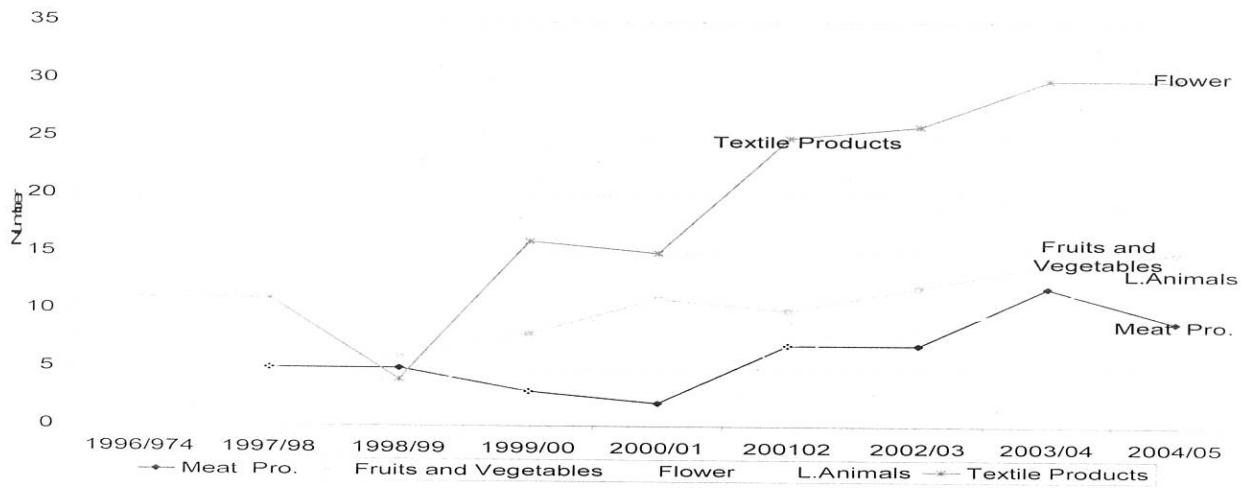
On the other hand, the market structure of commodities, which are termed non-principal based on their share in the total export such as Meat products, Live Animals Textile products, Fruits and Vegetables and Flower showed a volatile market structure. In addition, among with these commodities, Meat and Meat products and Live Animals have very high concentrated markets and as a result they are vulnerable to external shocks such as economic conditions in importing countries and policies like sanitary bans. Saudi Arabia and United Arab Emirates constituted more than 96 % of exports of Meat and Meat products and more than 82 % of Live Animals exported during 1996/97-2004/05.(See Table 8)

By the same token, the number of countries importing Textile and Textile Products and flower products are increasing at alarming rate presumably as a result of Every Thing But Arms (EBA) and African Growth and Opportunity Act (AGOA) given to developing countries.

The leading importers of textile and textile products are Italy and Belgium with combined share of 60% during 1966/67-2004/05.

Similarly, Holland, Germany and USA constituted more than 81% for the exports of flower. In this respect, Holland is the world's largest cut-flower exporter representing almost 55% of the world market shares. Colombia and Ecuador are second and third in world ranking. Hence, Exports of Ethiopian flower to Holland may be re –exported making use of her economies of scale. Kenya is the largest flower exporter with 55% market share of the continent followed by Zimbabwe (22%) and Zambia (6%). Ethiopia's position0.3%, in the exports of fresh cut flowers is marginal compared with other African countries (See Table 11).

Fig.8: Number of countries importing the non principal commodities of Ethiopia



Source: Author's compilation

Table 11: Africa's Leading Exporters of Cut Flowers ('000 US$)

Country	1992	1998	1999	2000	2001	Average Share
Kenya	61,477	131,550	141,326	144,441	165,336	55.10%
Zimbabwe	28,743	61,925	58,810	63,797	65,520	21.90%
Zambia	2,379	14,146	16,969	16,155	16,404	5.50%
South Africa	13,377	14,656	13,468	12,086	12,793	4.30%
Uganda		6,226	6,615	10,049	11,429	3.80%
Tanzania	1,076	6,361	7,800	6,752	9,142	3.00%
Morocco	16,224	9,661	7,067	5,804	5,433	1.80%
Mauritius	5,233	4,857	3,779	4,080	3,742	1.20%
Ivory Coast	2,064	2,112	2,182	2,533	3,509	1.20%
Rwanda					2,650	0.90%
Ethiopia	1,675	457	351	841	891	0.30%
Cameroon		642	703	858	856	0.30%
Malawi	674	3,147	1,110	558	651	0.20%
Egypt	534	435	576	476	595	0.20%
Total	133,456	256,521	261,100	269,205	299,841	100.00%

Source: Path fast Publishing

3. Literature Review

3.1 Empirical Literatures

(Lord, 1989) criticized the common modeling literatures on price formation of commodity markets as these models lacked theory consistent econometric models in their dynamic specifications. He contended that commodity market models that have used the reduced form of the system of equations would be unrelated to the separate estimates of parameters in the original structural form of the system of equations.

The author claimed that since production often has a great lagged response to price changes than does consumption in commodity markets, it is unclear whether parameter estimates of the supply and demand functions in the system satisfy the dynamic stability conditions of the resulting cobweb model when the price of the commodity is obtained from the reduced form of the model.

The modeling strategy designed by Lord departs from the usual modeling practices by providing separate estimates of the supply and demand components in commodity markets, and by using those parameter estimates to determine the steady state dynamic equilibrium solution for market prices.

In his modeling strategy although a common framework is applied to the characterization of the underlying data generating process in commodity markets, the inherent futures of each commodity markets are retained. According to his strategy he asserts that commodity markets differ from one another in terms of degrees of competitions that prevails among buyers and

sellers, the extent of market fragmentation and whether there are closes substitutes. In addition, market conditions give rise to different forms of competitions.

He formulated the dynamic relationships that characterized the adjustment processes of consumers and producers in markets towards their steady state equilibrium solution. He applied the general to specific estimation technique to seven major traded commodities such as coffee, cocoa, maize, soybeans, cotton, sugar, and copper. These products are representatives of the major international traded commodities.

He formulated the equilibrium relationship between consumption and demand changes by a cointegral process of the time series of these variables. The adjustment process of consumption to income changes was represented by the error correction mechanism (ECM), which corrects disequilibria that arises in the inter-temporal adjustment process between these cointegrated variables. The ECM representation of the relationship relating consumption, C, economic activity, y, and the commodity's price, p, relative to the general price index, D, is:

$$\Delta C_t = \alpha_1 \Delta y_t + \alpha_2 (c-y)_{t-1} + \alpha_3 y_{t-1} + \alpha_4 \Delta (p-d)_t + \alpha_5 (p-d)_{t-1} + v_{1t} \qquad (1)$$

He asserted for this model that the expected signs of $\alpha 1 \succ 0$ if the short run income elasticity is to be positive, $-1 \prec \alpha_2 < 0$ for the convergence of the lag distribution $a3 > a2$ if the long run income elasticity is to be positive $a4, a5 < 0$ for the price elasticity to be negative DC, Dyt are conintegrated if $a2^{1}\ 0$ and the term $\alpha_3 y_{t-1}$ accounts for the non proportional response of demand for a commodity as a result of change in the level of income.

Where:

$$\begin{cases} \alpha 3 \prec 0 & \text{Consumption is inelastic with respect to income} \\ \alpha 3 \equiv 0 & \text{Consumption is unitary elastic with respect to income} \\ \alpha 3 \succ 0 & \text{Consumption is unitary elastic with respect to income} \end{cases}$$

Since relative price changes can not continue indefinitely and the theoretical justification for their dynamic effects is absent, that is, $Dpt = 0$ in the long run. Hence, he formulated the long run dynamic relationship implicit in (1) as:

$$C = k_1 Y^{1\text{-}a3/a2} (P/D)^{-\alpha 5/\alpha 2} \qquad (2)$$

Where:

$$k_1 = \exp(-\alpha_0/\alpha_2 + \kappa g_2$$

$\kappa = (1-\alpha 1)/\alpha 2$ is the income growth elasticity. Thus, on a steady state growth path, the level of consumption depends on the rate of growth of income, g2, as well as on the level of income and of the price of the commodity.

As the dynamics underlying the production function are often characterized by long lags, the effects of price changes usually take a long time to work themselves through to supply. He represented lag structure of production by a stochastic difference equation where by difference formulation of the variables is nested in their level form. The advantage of this transformation is that it avoids multi-collearity between lagged values of the price variables

Hence, the expression for production, Q, in terms of market prices, P, relative to the general deflator, D, major disturbances, W, and a secular trend, T, measuring technological changes in the production process is:

$$\Delta q_t = \beta_o q_{t-1} + \sum_{k=0}^{n-1} \beta_{2+k} \Delta (p - d)_{t-k} + \gamma_3 (p - d)_{t-n} + \gamma_4 T + \gamma_5 W_t + \nu_{2t} \quad (3)$$

Where the expected signs are $\begin{cases} -1 < \beta_1 < 0 \\ \beta_{2+k}, \gamma_3 > 0 \\ \gamma_3, \gamma_5 > 0 \end{cases}$

Since production of a commodity has a transient response to the rate of change of its constant dollar price, the long run equilibrium solution of

$$Q = k2(P/D)^{-g3/b1} \quad (4)$$

Where $\{k2 = \exp[-(bo + g4T + g5W)/b1\}$.

Where there are constant returns to scale, the supply function will be constant and when there are increasing returns to scale the supply function is strictly decreasing. Technological changes in the production process are reflected in the value of the coefficient for T, and this change bring about a long-term, or secular, shift in the supply function.

There are two fundamental questions concerning the supply of commodities: one dealing with the price elasticity, the other dealing with lag structure.

The important measures of elasticity are (I) impact elasticity, which measures the first period response of production to a change in price. (II) The long run or total elasticity measures the cumulative response of production to a change in price

A compilation of the mean and median lags provides how rapidly the lag coefficients decline over time. As would be expected, an asymmetrical distribution, which tails of characterizes the supply response of all the commodities. The rate at which the lag coefficients converge to zero is also described by the difference between the median lag and the time it takes for 90% of the total response to occur.

The lag distributions are closely associated with the gestation period between the planting decision and harvesting of the agricultural commodities, and with the period between the investment decision and capacity initiation or expansion in minerals. For example the gestation period for coffee is 3-4 years.

The supply of these commodities can only be increased in the short run by expansion of output through yield improvements.

Finally after he estimated equations (1) and (3) using Two Stage Least Square method for seven commodities such as coffee, cocoa, maize, soybeans, cotton, sugar, and copper, he found, on average, the seven commodities has unitary income elasticity of demand. What he observed from the individual elasticity's is that since they varied from commodity to commodity, generalization about elasticity on the basis of an average would be misleading. Lord compared his estimates obtained in equation with other authors. For instance,(as sited in Lord, 1984, Akiyama and Dunkan ,1892 and Hwa ,1985 found 0.45 while Lord obtained 0.6 which are virtually similar.

On the other hand, Lord got the price elasticity's of demand significantly less than one for all commodities, the average elasticity for commodities being -0.25. His result is compatible with Hwa (1985), although it is somewhat lower than that estimated by Adams and Behrman (1976).

By the same token, on the production side of the model, equation (3), Lord (1989) has identified the lag distributions are closely associated with the gestation period between the planting decision and harvesting of agricultural commodities. For example, the gestation period for coffee is 3-4 years. The supply of these commodities can only be increased in the short run by the expansion of output through yield improvement. In contrast, over 90 percent of the total response of the supply of maize and soybeans occurs with in 2 years of a price change.

A trend variable, used to capture various forms of productivity improvements and institutional policies towards influencing producer decision was found to be significant in all commodities except cotton and copper.

F.B Horner (1952), on the other hand, put the elasticity of demand for the exports of a single country in a more precise definition of the concept and in measurable form than it has usually received which leads to the study of the demand for exports of one commodity at a time instead of the demand for exports as a whole.

In attempting to model the demand for the export of a country's export as a whole, one encounters first the difficulty of conceiving of a law of demand (routine of demand). But the greatest difficulty inherent in this approach lays in the diversity of the price changes, which would follow a variation of the exchange rate. When the exchange rate altered, the price of no two commodities will change in the same proportion except by coincidence. The result depends on the proportion of the world market for each commodity, which the exporting country happens to supply.

The factors that determine by how much the demand for the exports of a certain commodity from a given country will vary when there is a change in its export price according to F.B. Horner (1982). That is, he argued that the export prices of one country vary in response to a given change in the amount that country offers for exports. At one extreme, a country with a world monopoly of commodity simply faces the demand curve of the world market. At the other extreme, a country supplying a negligible proportion of free export market faces a demand curve of perfect elasticity that is elasticity of minus infinity. Between these extremes, where the exporting country supplies a more than negligible part of its export market, it can be readily seen that the price elasticity of demand on the export market depend on the proportion of that market it supplies and the elasticity of supply in other countries.

To make this approach useful in the study of exchange rates on he has gone further by integrating the impact of exchange rate. He has put the epact of exchange on exports quantities and export prices price in different scenarios:

He analyzed case-by-case starring from the impact of export rate on price. According to him, if the currency is devalued the export market price of the commodity in foreign currency will fall more, the more elastic is the supply in the devaluing country, and the less is the export demand. On the quantity of exports, on the other hand, the result will depend partly on the price elasticity of export demand and partly on the movement of price itself, that is, on the elasticity of supply in the devaluing country.

Since export receipt is the product of prices and quantities, the change in export receipt due to the devaluation will be resultant of the change in price and quantity. As a result, it will be possible to speak of the elasticity of export receipts as a whole, though not of elasticity of demand for exports

as a whole. The result depends, not strictly on the elasticity of supply in the devaluing country, but on what may be called ' the elasticity of export supply" in that country. The distinction could be important where there was an appreciable home market for the commodity, since the export supply could be augmented as its expense as well as through increased production.

The price elasticities of export demand, the elasticity of export supply, and exchange elasticities of export demand, export price a and export receipts. In addition there are cross elasticities of demand and supply, which have just been mentioned.

At any given level of export price, p, the amount X of any commodity demanded from a given country lord has formulated the export market equal to the total demand of the export market less that part S' which is met by other supplying countries as follows:

$$\frac{dX}{dp} = \frac{dD}{dp} - \frac{dS'}{dp},$$

In terms of elasticities,

$$h_{xp} = \frac{D}{X} h_{dp} - \frac{S'}{X} h_{s'p} \qquad (5)$$

Where h_{dp} the price elasticity of demand in the export market is, h_{xp} is the price elasticity of export demand for the given country's product, and $h_{s'p}$ is the elasticity of supply in competing countries.

Thus the price elasticity of export demand for a commodity from a given country depends on the proportion of export market it supplies, $\frac{X}{D}$ and on the elasticity of supply in computing countries, as well as on the elasticity of demand for the commodity in the export market.

The demand term $\frac{D}{X}h_{dp}$ can be divided in to as many terms as there are many consuming countries in the export market, each with its own value of D and h_{dp}; and the supply term $\frac{S}{X}h_{s'p}$ can be similarly divided. For simplicity the home market of each of this competing suppliers can be represented by a separate demand term; this is preferable to interpreting their supply terms as relating to net export supply only.

To take account of tariffs and transport costs equation (1) can be rewritten:

$$h_{xp} = \frac{D}{X}\frac{p}{p+t}h_{dp} - \frac{S'}{X}\frac{p}{p+t-t'}h_{s'p} \qquad (6)$$

According to Horner, the next step is to derive the required elasticities linking export receipts and the exchange rate in terms of concepts which are directly measurable; let p be the export price as before in foreign currency, and let P be the export price in domestic currency. Let r be the exchange rate defined as the price of foreign currency in home units. Then P= rp. What is required first is an expression for the change in foreign price associated with a given change in the exchange rate that is the exchange elasticity of export price.

$$h_{pr} = h_{Pr} - 1$$

Thus, these two elasticities are in effect complementary: The less devaluation affects the export prices in foreign currency, the more it will affect that price in domestic currency.

Let export supply be called E, then the change in E and the change in export demand X, with respect to variations in the exchange rate, r, must be equal.

Thus:

$$\frac{dE}{dP}\frac{dp}{dr} = \frac{dX}{dP}\frac{dp}{dr},$$

In terms of elasticity, since P=rp,

$$h_{pr} = \frac{h_{ep}}{h_{xp} - h_{ep}} \qquad (7)$$

Where:

η_{ep} is the elasticity of export supply with respect to export price in domestic currency; this concept will be derived from the measurable elasticities later

Since, there is more than one export commodity additional terms are required to allow for the cross elasticities of export demand. Thus the exchange elasticites of export demand are expressed by:

$$\eta xr = \eta_{xp}\eta_{pr} + \text{Terms containing cross elasticity} \qquad (8)$$

The final movement of export receipts has been described above as the resultant of the movements in prices and quantities. That is to say, the elasticity of export receipts is the sum of the elasticities of export prices and export demand

$$h_{Rr} = h_{pr} + h_{xr} \qquad (9)$$

There will be an expression like this for all export commodities, and, since it refers to money values, aggregation is now a simple matter. It is only necessary to add the elasticities of export receipts for the individual commodities, each weighted by its share by the total export receipts:

$$\eta_{\sum R} = \frac{d\sum R}{dr}\frac{r}{\sum R}$$

$$= \sum \frac{R}{\sum R}\eta_{Rr} \qquad (10)$$

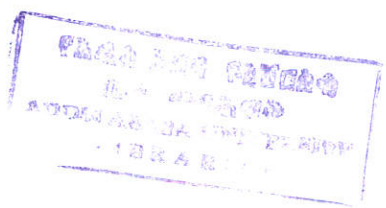
When the values of h_{pr} *and* h_{xr} obtained, whether devaluation will improve or worsen the balance of payments on the export can be determined using the above equation.

Malachi (1957) has studied the elasticity of demand for four Canadian exports items such as Wheat, newsprint, wood pulp and iron ore that constituted on the average 32 percent of the total Canada's exports. He employed the following equations to measure the price and income elasticities of demand:

$$(Q_t) = \beta_0 + \beta_1 \log(y_t) + \beta_2 \log(REER_t) + \varepsilon_t \qquad (11)$$

Where:

Q_t= quantum of commodity consumed, REER is real effective exchange rate which measures relative price and β_1 and β_2 are the income and price elasticity respectively. Since the elasticity of demand for agricultural commodities and raw materials usually is relatively low, he asserted that the price elasticities calculated from historical aggregate export data tend to be low. Currency devaluation, however, would cut the price of high- elasticity commodities as well as of commodities whose price might not fluctuate much ordinarily. Hence a more appropriate technique would be to calculate the demand elasticity's for the individual export commodities and then sum these elasticities in some meaning full fashion.



This procedure seems reasonable in that the assumption a routine of demand seems much more justifiable.

After estimating equation (11), he obtained income elasticity of demand for Wheat, Newsprint, Wood pulp and Iron ore, respectively, 0.13, 1.00, 1.09 and 1.43. The corresponding figures for price elasticity of demand for the commodities mentioned above were respectively -0.8, -0.24, -0.2 and -1.87.

To calculate the elasticity of demand of Canadian export markets for each of these products, he required additional information on the proportion of the export market Canada supplied and the elasticity of supply from computing countries. The derived elasticities of foreign demand for each of the exports were then obtained from the following equation:

$$nXp = \frac{D}{X}\frac{p}{p+t}\eta D_{p+t} - \frac{S'}{X}\frac{p}{p+t-t'}\eta S'_{p+t-t'} \qquad (12)$$

Where:

nXp = Elasticity of demand for the Canadian exports of commodity

ηD_{p+t} = the elasticity of demand for the commodity in general in the export market

$\eta S'_{p+t-t'}$ = The elasticity of supply from competing countries

p = Price in the home country expressed in foreign currency

$p+t-t'$ = The price in the competing country, that is, the landed price less the transport cost and specific tariff per unit between the competing country and the importing country.

Based on the above adjustments of elasticities, he estimated the price elasticity of export demand for Canadian agricultural products such as Wheat, Newsprint, Wood pulp, and Iron ore where supply elasticities are assumed respectively, -13.6, -1.7, -2.5 and -162.4. Similarly, employing the

same technique of equation (11) above, he obtained Canadian price elasticity of export supply for the commodities mentioned above he obtained the following supply elasticities: Wheat (1.14), Newsprint (90.86), Wood pulp (5.87) and Iron ore (2.61)

Morris Goldstein and Moshin Khan (1978) have introduced two relatively simple models of export demand and export supply equations and then estimated simultaneously so as to eliminate any bias arising from the two ways relationship of export quantities and export prices. They have constructed two types of models for both export quantity and price determination based on whether the dependent variables (export quantity and price) adjusts instantly to the effect of the explanatory variables.

1. Equilibrium Model

In this model, they have specified the world demand for an individual country's export in the log-linear form as follows:

$$\log Xt^{d} = \alpha_{o} + \alpha_{1} \log\left(PX/PXW\right)_{t} + \alpha_{2} \log YW_{t} + \mu_{1t} \qquad (13)$$

Where

Xt^{d} = Quantity of export demanded

PX = Price of exports

PXW = Weighted average of the export prices of the country's trading partners

YW_{t} = Weighted average of the real incomes of the countries trading partners

μ_{1t} = The residual

Since equation (13) is specified in logarithms, a_1 and a_2 are the relative price and real income elasticity of export demand, respectively. It is expected that a_2 will be negative and a_2 will be positive.

The supply of exports is specified as a log linear function of the relative prices of exports (the ratio of export prices and domestic prices.

$$\log X_t^S = bo + b_1 \log\left(\left(PX/P\right)_t\right) + b_2 Y^* \qquad (14)$$

Where:

Xs = Quantity of export supply

PX = Price of exports

PX = Domestic price index

Y^* = Logarithm of an index of domestic capacity

To see the effects of solely exogenous variables on the quantity and price of exports, it can be obtained by estimating these two equations simultaneously as follows:

$$\log Xt = a_o + \frac{a_1 b_o}{D} - \frac{a_1 \log PXW_t}{D} + \frac{a_2}{D}\log YW_t + \frac{a_1 b_2}{D} Y^*_t + \frac{a_1 b_3}{D}\log Pt \qquad (15)$$

$$\log PXt = \frac{b_1 + aob_1}{D} - \frac{a_1 b_1 \log PXW_t}{D} + \frac{a_2 b_1}{D}\log YW_t + \frac{b_2}{D} Y^*_t + \frac{b_3}{D}\log Pt \qquad (16)$$

Where D = $1-a_1 b_1$

B. Disequilibria Model

In order to introduce the possibility of disequilibria behavior in to export model, Morris Goldstein and Moshin Khan (1978) employed the adjustment mechanism outlined by Houthakker and Taylor (1970).

In this model, export quantities are assumed to adjust to the difference between demands for exports on period t and the actual flow in the previous period.

$$DXt = g\left[\log X_t^{d} - \log X_{t-1}\right] \qquad (17)$$

Where:

g is the coefficient of adjustment.

The adjustment function (17) assumes that the quantity of exports adjusts to excess demand in the rest of the world, and therefore the price of exports is determined in the exporting country.

By substituting (1) in to (17) they obtained an estimating equation for exports:

$$\log Xt = c_o + c_1 \log\left(\frac{PX}{PXW}\right)_t + c_2 \log YW_t + c_3 \log X_{t-1} \qquad (18)$$

Where: $c_0 = ga_0$, $c_1 = ga_1$, $c_2 = ga_2$, $c_3 = 1- g$

With the expected signs of parameters c1<0, c2>0 and c3>0

The mean time lag in the adjustment of exports is equal to γ -1 and can be calculated from the parameters of equation (18) as $(1-c3)^{-1}$.

Since the quantity of exports is specified as adjustment to excess demand, the price of exports adjusts to conditions of excess supply:

$$\Delta PXt = \lambda\left[\log X_t - \log Xt^S\right], \lambda > 0, \qquad (19)$$

Where:

l is the adjustment coefficient.

In this framework, an increase in excess supply will lower the price of exports, and conversely for decrease.

Substituting equation (14) in to (19) and solving for PXt, we obtain:

$$\log PX_t = d_o + d_1 \log Xt + d_2 \log P_t + d_3 Y_t^* + d_4 \log PX_{t-1} \qquad (20)$$

Where do = $\frac{\lambda\beta o}{1+\lambda\beta 1}$, d1= $\frac{\lambda}{1+\lambda\beta 1}$, d2= $\frac{\lambda\beta 1}{1+\lambda\beta 1}$, d3= $-\frac{\lambda\beta 2}{1+\lambda\beta 1}$ and d4= $\frac{\lambda\beta o}{1+\lambda\beta 1}$

Since $b1 > 0$, $b2 < 0$ and $l > 0$, the expected signs for parameters in equation (20) would be

$d_1>0$; $d_2>0$; $d_3<0$ and $d_4>0$

The reduced form equation, which obtained from equations (19) and (20) are:

$$\log Xt = c_o + \frac{c_1 d_o}{D'} - \frac{c_1 \log PXW_t}{D'} + \frac{c_2}{D'}\log YW_t + \frac{c_1 d_3}{D'} Y^*_t + \frac{c_1 d_2}{D'}\log Pt + \frac{c_1 d_4}{D'}\log PX_{t-1} + \frac{c_3}{D'}\log X_{t-1} \qquad (21)$$

$$\log PXt = \frac{d_o + d_1 c_o}{D'} - \frac{c_1 d_1 \log PXW_t}{D'} + \frac{c_2 d_1}{D'} \log YW_t + \frac{d_3}{D'} Y^*_t + \frac{d_2}{D'} \log Pt + \frac{d_2}{D'} \log Pt + \frac{d_4}{D'} \log PX_{t-1} + \frac{c_3 d_1}{D'} \log X_{t-1} \quad (22)$$

Where $D' = 1 - c_1 d_1$.

Morris Goldstein and Moshin Khan have estimated both the equilibrium and disequilibria models for eight countries such as Belgium France, Germany, Italy Japan, Netherlands, United Kingdom and United states which all are developed countries. The estimator they used was Full information Maximum Likelihood (FIMLH). They have found price elasticites, which are greater than one for 6 of the 8 countries in the disequilibria model indicating than fairly large response of exports to change in relative price.

Francis X. Browne (1982),on the other hand, has criticized the Goldstein and Khan (1978) dynamic two-equation model of export supply and demand arguing that the Goldstein and Khan models are inappropriate for the small open economies both on theoretical model and empirical application.

The source of this critic is the adjustment mechanism for price and quantity. According to Goldstein and Khan (1978) export quantities are assumed to adjust to discrepancy between world desired demand in the current period and the actual flow of exports in the previous period, while the price of exports is assumed to adjust to conditions of excess supply, that is,

$$\Delta Xt = \gamma(\log Xtd - \log Xt - 1), \quad \gamma > 0 \quad (23)$$

$$\Delta PXt = \lambda(\log Xt - \log Xts)\ ,\ \lambda > 0 \qquad (24)$$

Implying that export quantities are demand determined and export prices are supply determined.

However, according these researchers, this disequilibria specification is clearly not that of the small open economies model in which exporters are price takers. The following dynamic specification is proposed for small open economies in which the export quantities adjust towards suppliers' desire value, while export price vary in line with demand conditions:

$$\Delta PXt = \lambda'(\log Xt^{d} - \log Xt)\ ,\ \lambda' > 0 \qquad (25)$$

$$\Delta Xt = \gamma'(\log Xt^{d} - \log Xt - 1)\ \gamma' > 0 \qquad (26)$$

According to Francis X. Browne although the fit of the GK model is good, the parameter values are implausible. The small open economy (SOE) would suggest a perfect competition on world markets and since the small open economy would suggest a low value of the non traded sector as it is small relative to the total and hence a change in export prices will not elicit a large supply response because of the relative unavailability of factors of production from the non traded sector.

According to the estimates obtained by the Francis model neither variation in exports neither quantities nor world income has any significant direct effect on export prices. Furthermore, the estimates for their model indicate that variations in export quantities are mainly determined by variation in the arguments affecting supply.

Johnson and Tweeten (1967, 1977) have provided estimates of the elasticity of export demand for specific agricultural commodities and aggregate agricultural exports. Their estimates indicate that the aggregate export demand for US agricultural commodities is very elastic with respect to price and the estimated elasticity is fairly greater than 6 in both cases. The elasticities of export demand for specific commodities are also very large ranging from -2.8 for soybeans to -10.18 for feed grains (Johnson, 1967)

Theoretically, the elasticity of export demand may be quite large. However, the Johnson Tweeten estimate does not consider government policies, which insulate domestic producers and consumers from external price fluctuation.

Following Tweeten (1967, P.361), an appropriate expression for the elasticity of export demand for a commodity is:

$$E_{ef} = \sum_{i} \left[E_{di} E_{pi} \frac{Q_{di}}{Q_{ef}} - E_{si} E_{pi} \frac{Q_{si}}{Qe_{f}} \right],$$

Where E_{ef} is the elasticity of export demand, E_{di} and E_{si} are the elasticity of domestic demand and supply in country i; Q_{di} and Q_{si} are the i^{th} country's level of demand and supply and Q_{si} is the level of US exports. The elasticity of price transmission (response of the i^{th} country's price to change in the US price)

With exception of wheat, the United States historically has served the role of residual supplier for the agricultural commodities considered here. Principal competing feed grain and soybean-exporting countries export a desired quantity by varying exchange rates, export taxes and

incentives. Of critical importance is the insulation of internal consumption and production price from world market prices in almost all cases.

Raymono F. Mikesell (1963) challenged the general assumption of the balance of payments difficulties of poor countries or primary-exporting countries stem from the fluctuations in the price of export proceeds from primary products. They argued on the contrary that although there is considerable evidence that relatively short term fluctuations in export proceeds is a contributing factor, it is not a major source of balance of payments difficulties for most poor countries. They generally contend that except for crop failure or natural disaster, in virtually all cases, consequences of balance of payment problems of poor countries are international forces, which are beyond the control of individual country and hence call for an international solution.

3.2 International Trade Theories and Their Significance on Ethiopian Economy

According to the premise of classical and neoclassical comparative advantage and factor abundant trade theoretician, underdeveloped countries like Ethiopia should be dedicated in exports of primary commodities in which they are more efficient to produce.
(Alemayehu, 2002). These economists presumed that due to population pressure and urbanization in the global framework, wages and costs of production in manufacturing sector would be low whereas as population expansions and consumption per head increases, agricultural production would show diminishing returns. According to them, this steers to raise the relative prices of primary commodities. (Singer, 1987; Sarkar, 1986; Sparos, 1982 as sited in Melse, 2004).

However, on the other hand, Stewart (1984) disagreed by the above persuading, asserted that the issue of unemployment, the terms of trade effect and the question of capital and skill accumulation should be taken in to consideration instead of focusing on the narrow views of conventional trade theories to explain the trade patterns of developed and developing countries.

Similarly, a number of prominent economists scrutinized the terms of trade deterioration of primary commodities mainly to the lower elasticity of demand[7] for primary commodities, technological difference between manufacture goods producers and market structure differences

[7] The elasticity argument states that both the price elasticity of demand and income elasticity of demand for primary commodities, especially agricultural; products are lower than that of manufactured goods. Where lower price elasticity of demand implies there will be no compensation in balance of payments, that is, as result of increasing volume there is in drop in prices.

(Gebre- Hiwot; 1921; Prebish, 1950; Singer, 1950 Kaldor 1963 as cited in Melese, 2004).

The other approach with related to technological difference is that, first, the technological enhancements of developed countries directs them to produce synthetic substitutes for primary commodities, second, since the developed countries exports' of multilateral firms encompass more sophisticated technology, the prices of manufactured exports will embody monopolistic profit with in it. Thirdly, the difference in market structure of primary commodities and manufactured goods emanates from organized labors and strong monopolistic producers in industrial countries; the market for manufactured goods would be characterized by fix- price mechanism. On the contrary, in developing countries where unemployment is higher and labors and producers are not organized, an increase in productivity would lead to a decline in product price. The cyclical impact of the developed economy on the developing countries also demonstrated that during upsurge in economies of developed countries, profit increases would be absorbed by higher wages as labor is organized while during recessions in these economies, the decreased profit would transfer to decline to production of primary producers as the demand would decline. (Prebish , 1962 as sited in Melese, 2004)

On the other digression of Emanuel (1972), he claimed that the growing power of trade unions in developing countries and the consequent rise of the price of manufactured goods does not have straightforward deterioration of terms of trade of primary commodities rather what deteriorate actually is the terms of trade of developing countries.

The income elasticity argument originates from Engle's law that states the demand for primary commodities is bound to expand less than the demand for Manufactured products when income grows.

Since the assumptions of classical and neoclassical trade theorists' such as:

(i) Perfect competition in product and factor markets

(ii) No cost of transportation and no trade barriers

(iii) Constant returns to scale

(iv) Homogeneous factors of production in quality and causelessly mobile between industries

(iv) Inelastic supply of labor in each country are not plausible in Ethiopian reality, on the other hand, the assumption of the structural economists depicted above convene the Ethiopian experience, henceforth, modeling the commodities of Ethiopia is based on the latter's presumptions.

4. Model specification and explanation of variables

4.1 Model specification

The export supply and demand models for the various export commodities are modeled following from Goldstein and Khan (1978), Francis X. Browne (1982) and Lord (1989)

4.1.1 Export Demand Equations

$$X_{(COF)t}^{d} = \alpha_o * \left[REER_t\right]^{\alpha 1} * \left[YW_{(COF)t}\right]^{\alpha 2} * \left[WP_{(COF)t}\right]^{\alpha 3} * \exp(\varepsilon_{1t}) \quad (1)$$

$$X_{(OSD)t}^{d} = \beta_o * \left[REER_t\right]^{\beta 1} * \left[YW_{(OSD)t}\right]^{\beta 2} * \left[P_{(OSD)t}\right]^{\beta 3} * \exp(\varepsilon_{2t}) \quad (2)$$

$$X_{(HS)t}^{d} = \delta_o * \left[REER_t\right]^{\delta 1} * \left[YW_{(HS)t}\right]^{\delta 2} * \left[P_{(HS)t}\right]^{\delta 3} * \exp(\varepsilon_{3t}) \quad (3)$$

$$X_{(PUL)t}^{d} = \phi_o * \left[REER_t\right]^{\phi 1} * \left[YW_{(PUL)t}\right]^{\phi 2} * \left[P_{(PUL)t}\right]^{\phi 3} * \exp(\varepsilon_{4t}) \quad (4)$$

$$X_{(CHAT)t}^{d} = \gamma_o * \left[REER_t\right]^{\gamma 1} * \left[YW_{(CHAT)t}\right]^{\gamma 2} * \left[P_{(CHAT)t}\right]^{\gamma 3} * \exp(\varepsilon_{5t}) \quad (5)$$

Equations (1)-(5) can be reformulated in logarithm form in the following way to obtain the demand elasticities.

$$\log X_{(COF)t}^{d} = \alpha_o + \alpha_1 \log REER_t + \alpha_2 YW_{(COF)t} + \alpha_3 WP_{(COF)t} + \varepsilon_{1t} \quad (1')$$

$$\log X_{(OSD)t}^{d} = \beta_o * + \beta_1 \log REER_t + \alpha_2 YW_{(OSD)t} + P_{(OSD)t} + \varepsilon_{2t} \quad (2')$$

$$\log X_{(HS)t}^{d} = \delta_o * + \delta_1 \log REER_t + \delta_2 YW_{(HS)t} + \delta_3 P_{(HS)t} + \varepsilon_{3t} \quad (3')$$

$$\log X_{(PU)t}^{d} = \phi_o * + \phi_1 \log REER_t + \phi_2 YW_{(COF)t} + \phi_3 P_{(COF)t} + \varepsilon_{4t} \quad (4')$$

$$\log X_{(CHAT)t}{}^{d} = \gamma_o + \gamma_1 \log REER_t + \gamma_2 YW_{(CHAT)t} + \gamma_3 P_{(CHAT)t} + \varepsilon_{5t} \quad (5')$$

Where:

$\log X_{(COF)t}{}^{d}, \log X_{(OSD)t}{}^{d}, \log X_{(HS)t}{}^{d}, \log X_{(PU)t}{}^{d}, \log X_{(CHAT)t}{}^{d}$ represents the logarithm of the actual values of coffee, Oilseeds, Hides and skins, Pulses and chat exports respectively deflated by their corresponding prices indices to make them real variables.

$\log REER_t$ = the logarithm of real effective exchange rate index,

YW_{it} = real income of trading partners for each commodity. However, as we have seen in Chapter II of this paper the share of trading partners vary from year to year so we used the trade weighted average income of the trading partners.

$\log WP_{(it)}$ = An index of the international price of commodities such as Coffee, Oilseeds, Pulses and Hides and Skins with 1980/81 base year (1980/81=100). The prices of Chat and Pulses have been generated from its export unit prices as the international publication failed to record the prices data for these commodities.

4.1.2 Export Supply Equations

$$X_{(COF)t}{}^{s} = \alpha_o' + \alpha_1' \log REER_t + \alpha_2' \log DPRO_{(Cof)t} + \alpha_3' \log WS_{(COF)t} + \alpha_4' WP_{(COF)t} + \alpha_5' \log RGPSC_t + \alpha_6' \log ITL_t + \alpha_7' \log ARF_t + \alpha_8' \log RAPRO_t + \alpha_9' \log NAPRO_t + \alpha_{10}' \log FERSOD_t + \alpha_{11}' TROADL_t + \alpha_{12}' ERGAP_t + \alpha_{13} DCHGOV + \alpha_{14}' \log ETRM + \varepsilon_{1t}' \quad \ldots\ldots\ldots\ldots (7)$$

$$X_{(OSD)t}^{s} = \beta_o' + \beta_1' \log REER_t + \beta_2' DPRO_{(OSD)t} + \beta_3' \log WS_{(OSD)t} + \beta_4' WP_{(OSD)t} +$$
$$\beta_5' \log RGPSC_t + \beta_6' \log ITL_t + \beta_7' \log ARF_t + \beta_8' \log RAPRO_t + \beta_9' \log NAPRO_t +$$
$$\beta_{10}' \log FERSOD + \beta_{11}' TROADL + \beta_{12}' ERGAP + \beta_{13}' DCHGOV + \beta_{14}' \log ETRM + \varepsilon_{1t}' \cdots\cdots\cdots (8)$$

$$X_{(HS)t}^{s} = \delta_o' + \delta_1' \log REER_t + \delta_2' \log DPRO_{(HS)t} + \delta_3' \log WS_{(HS)t} + \delta_4' \log WP_{(HS)t} +$$
$$\delta_5' \log RGPSC_t + \delta_6' \log ITL_t + \delta_7' \log ARF_t + \delta_8' \log RAPRO_t + \delta_9' \log RNAPRO_t +$$
$$\delta_{10}' \log TROADL + \delta_{11}' ERGAP + \delta_{12}' DCHGOV + \delta_{13}' \log ETRM + \varepsilon_{1t} \cdots\cdots\cdots\cdots\cdots\cdots (9)$$

$$X_{(PU)t}^{s} = \phi_o' + \phi_1' \log REER_t + \phi_2' \log DPRO_{(PU)t} + \phi_3 \log WS_{(PU)t} + \phi_4' \log WP_{(PU)t} + \phi_5' \log RGPSC_t$$
$$+ \phi_6' \log ITL_t + \alpha_7' \log ARF_t + \phi_8' \log RAPRO_t + \phi_9' \log RNAPRO_t + \phi_{10}' \log FERSOD +$$
$$\phi_{11}' \log TROADL_t + \phi_{12}' ERGAP_t + \phi_{13}' DCHGOV_t + \phi_{14}' \log ETRM_t + \varepsilon_{1t}' \cdots\cdots\cdots\cdots\cdots\cdots (10)$$

$$X_{(CHAT)t}^{s} = \gamma_o' + \gamma_1' \log REER_t + \gamma_2' \log DPRO_{(CHAT)t} + \gamma_3 \log WS_{(CHAT)t} + \gamma_4' \log WP_{(CHAT)t} +$$
$$\gamma_5' \log RGPSC_t + \gamma_6' \log ITLt + \gamma_7' \log ARF_t + \gamma_8' \log RAPRO + \gamma_9' \log RNAPRO +$$
$$\gamma_{10}' \log FERSOD + \gamma_{11}' \log TROADL + \gamma_{12}' ERGAP + \gamma_{13} DCHGOV + \gamma_{14} l \log ETRM + \varepsilon_{1t} \text{ -----} (11)$$

Where

$X_{(it)}^{s}$ = Export supply of commodity i, (i = Coffee, Oilseeds, Hides and skins, Pulses and Chat) during the time period t (t =1970/71-2003/04)

$DPRO_{(it)}$ = Domestic Production of commodity i at time t where i and t are as defined above.

$WS_{(it)}$ = World supply of commodity i in period t

$WP_{(it)}$ = International prices of commodity i in period t

$RGPSC_t$ = Gross private sector credit in period t

ITL_t = International Trade loan for export in period t

ARF_t = Average rain fall in period t

$RAPRO_t$ = Real agricultural production in period t

$RNAPRO_t$ = Real non agricultural production in period t

$TROADL_t$ = Total road length at time t

$ERGAP_t$ = Exchange rate gap as defined in the in the text (Parallel exchange rate-Official exchange rate)/ official exchange rate at time period t

$DCHGOV$ = Dummy for change of government

$ETRM$ = Export tax regime which defined as the ratio of export tax revenue to total Export revenue

4.1.3 Supply demand equilibrium

$$\log X_{ti}^{d} = \log X_{ti}^{s} \quad \cdots\cdots\cdots\cdots\cdots (13)$$

$\forall$ i, t (i= coffee, Oilseeds, Hides and skins, Pulses and Chat, t= 1970/71-2003/04

Equating equations (1') – (5') with (8)-(11), we can obtain the demand for and the supply of each commodity considered in the model. For instance, combining the demand for coffee, equation (1'), and the supply of coffee, equation (8) in the following manner and based on the GK, Houthaker and Tayalor (1970) and Fransis X. Browne modes for a small open economy like Ethiopia where exporters are regarded as price takers in the international markets export quantities are assumed to adjust to the suppliers desired value while export prices vary in line with demand. That is,

$$\Delta \log X_t = \gamma\left(\log X_t^s - \log X_{t-1}\right) \quad \gamma > 0 \ldots\ldots\ldots\ldots\ldots\ldots (14)$$

$$\Delta \log PX_t = \lambda\left(\log X_t^d - \log X_t\right) \quad \lambda > 0 \ldots\ldots\ldots\ldots (15)$$

Now substituting equations (1')-(5') in to equation (15) and equations (8) –(11) in to equation (14) and equating equations (1')-(5') (demand equations) with equations (8)-(11) (supply equations), we obtain equation (16) an (17)

$$\log X_{it} = p_{io} + p_{i1}\log PXit + p_{i2}\log RWY + p_{i3}\log REER_t + p_{i4}\log DPROit + p_{i5}\log WSit + p_{i6}\log RGPSC_t + p_{i7}\log ITL_t + p_{i8}\log ARF_t + p_{i9}\log RAPRO_t + p_{i10}\log NRAPRO_t + p_{i11}\log FERSOD_t + p_{i12}\log TROADL_t + p_{i13}\log ERGAP_t + p_{i14}\log ETRM + p_{i15}\, DCHGOV + e_{17t} \quad (16)$$

$$\log PXit = r_{i0} + r_{i1}\log Xit + r_{i2}\log REER_t + r_{i3}\log RWY_t + r_{i4}\log DPROit + r_{i5}\log WSit + r_{i6}\log RGPSC_t + r_{i7}\log ITL_t + r_{i8}\log ARF_t + r_{i9}\log RAPRO_t + r_{i10}\log NRAPRO_t + r_{i11}\log FERSOD_t + r_{i13}\log TROADL_t + r_{i14}\log ERGAP_t + r_{i15}\log ETRM r_{i16} DCHGOV + e_{18t} \ldots\ldots\ldots\ldots\ldots (17)$$

Variables are as defined above

After we obtained the estimated equation for all principal commodities in the way equation (16) and (17) put above, if the correlation between the contemporaneous errors is large, that is at least greater than 90% we estimate them using simultaneous modeling technique employing restricted Two Stage Lest Square, otherwise the demand and supply equations would be estimated separately using single equation estimation technique.

4.1.4 Reduced form Equation for Manufactured Exports and Other Exports

Since the international prices of manufactured and semi manufactured exports and for other export items which are the residual from the total export are not available, it has been difficult to model this items by the above simultaneous equation model and as result we tend to employ the reduced form model. In this regard, these two equations will be estimated by simple OLS and Dynamic OLS estimation techniques alternatively.

4.1.5 Reduced form Equations for Other Exports

$$\log X_{(OTR)t} = \eta_o + \eta_1 \log REER_t + \eta_2 YW_t + \eta_3 \log RGPSC_t + \eta_4 \log ITL_t + \eta_5 \log ARF + \eta_6 \log RAPRO_t + \eta_7 \log NAPRO_t + \eta_8 \log TROADL_t + \eta_9 ERGAP_t + \eta_{10} DCHGOV + \varepsilon_{6t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (18)$$

Where:

$\log X_{(OTR)t}$ = Other real export value which obtained by deducting the principal export items mentioned above from total export value export values and deflated by export unit value index to obtain the real values of these exports items

4.1.6 Reduced form Equation for Manufactured exports

$$X_{(MaX)t} = \lambda o + \lambda_1 \log REER_t + \lambda_2 \log RGPSC_t + \lambda_3 \log RYW_t + \lambda_4 \log ITL_t + \lambda_5 \log ARF_t + \lambda_6 \log RNAPRO_t + \lambda_7 \log RAPRO_t + \lambda_8 \log TROADL_t + \lambda_9 \log ERGAP_t + \lambda_{10} ETRM_t + \lambda_{11} \log ELGEN_t + \lambda_{12} DCHGOV + \varepsilon_{7t} \quad \ldots\ldots\ldots\ldots (19)$$

4.2 *Data Sources and Estimation Technique*

4.2.1. Data Sources

The data used in this study obtained from various sources. The main data sources are the National Bank of Ethiopia different annual reports and quarterly bulletins, Central Statistical agency Agricultural Sample Surveys, United Nations different publications like UNCTAD and IMF CD ROMs. Other sources included Ministry of Agriculture and Rural Development (MoARD), Ministry of Trade and Industry (MoTI)

4.2.2. Estimation technique

In this time series modeling technique, the time series characteristics of the variables, that are stationarity and cointegration in all the equations under consideration is undertaken.

4.2.3 Unit root tests

Since, we need to know the underlying process that generates our time series variables: that is, whether the variables are stationary or non-stationary we tested the unit root test fro all variables considered except for dummy variables. Non-stationary variables might lead to spurious regressions. In this case the results may suggest statistically significant relationships between the

Annex 1.1 Variable Definitions

Variable	Description	Source	Unit
AOSD	Domestic Area Cultivated By Private Peasants for Production Of Oilseeds	CSA	10^3 ht
APUL	Domestic Area Cultivated By Private Peasants for Production Of Pulses	CSA	10^3 ht
AVRF	Average Rain Fall	Meteorology Enterprise	10^3 mm
CHATVOL	Export Of Chat Volume	NBE	10^3 kg
CLOSE	Closed Ness = (GDP/(X+M)*100	NBE	
DCOFPROD	Domestic Coffee Production	MoARD	10^9 kg
COFVOL	Volumes Of Exports Of Coffee	NBE	10^3kg
CPI	Domestic Consumer Price Index (1980/81=100)	NBE	Index
CPIFD	Food Domestic Price Index	NBE	Index
CPINFD	Non Food Domestic Price Index	NBE	Index
DDMKT	Dummy for Market Liberalization	NBE	One for market liberalization and 0 for not
DDRT	Dummy For Drought	NBE	One for drought years and 0 for good years
DEXCON	Dummy Exchange Control	NBE	One for exchange control years and 0 for not
DWAR	Dummy War	NBE	One for war years and 0 for peace years
ELG	Electricity Generation	NBE	10^3 Kilo watt

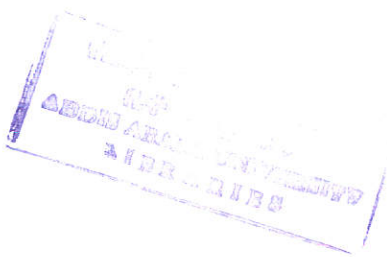
variables in the model, when in fact this is just evidence of contemporaneous correlation. We employed the Augmented Dickey–Fuller (ADF) and the Phillips–Perron (PP) tests to examine our variables for the presence of a unit root. The ADF test assumes that the data generating process is autoregressive to the first order. This is done so that the autocorrelation in the error term does not bias the test. The

ADF includes first-difference lags in such a way that the error term is distributed as a white noise. The Phillips–Perron (PP) test on its part addresses the problem of the unknown structure of the data generating process under the null hypothesis by adjusting the t-statistic for

the potential omitted variable bias ex post. To test for a unit root, the above equations will be estimated by Full information Maximum Likelihood technique and the t-statistic of P is corrected for serial correlation. If the results of the unit root tests show that the variables are not stationary in their levels, we proceed with a cointegration analysis.

4.2.4. Cointegration analysis

In a regression involving non-stationary variables, spuriousness can only be avoided if a stationary cointegrating relationship is established between the variables. Therefore, if two or more variables can be linked together to form an equilibrium relationship spanning the long run, then even though the variables themselves may contain stochastic trends, they will nevertheless move closer over time and the difference between them will be stable. To test for cointegration in this paper, we run our regressions and use the ADF and the PP unit roots test to test for the stationary of the residuals. If the residuals are stationary, then we conclude for cointegration of series used in the model.



4.2.5 Simultaneous Equation Models

Interaction and interdependence of economic variables make it necessary that economic models should incorporate a set of equations, which describes the behavior of a certain variables, which appears in other equations as explanatory variables. This setting of economic models has important implications for estimation and inference. The introduction of stochastic dependent variables to the right hand side of equations lead to the violation of the assumption that repressors are fixed (non` stochastic) in repeated trials and are not correlated with the errors.

A simultaneous equations model incorporates behavioral equations, endogenous and exogenous variables, pre determined variables, and parameters.

In a two equation simultaneous equation model of the type described below, equations (1) and (2), there are two important conditions to be full filed before estimation undertaken.
The order condition (necessary condition) for a structural equation stated that at least one exogenous variable is excluded from the structural equation under study. On the other hand, the rank condition (necessary and sufficient condition) stated that a model is identified if and only if the second equation contains at least one exogenous variable with a non zero coefficient that is excluded from the first equation under study.

Generally, a simultaneous model of two structural equations can be written as:

$$\log X_{(COF)t} = \alpha_o + \alpha_1 \log REER_t + \alpha_2 \log YW_{(COF)t} + \alpha_3 WP_{(COF)t} + \varepsilon_{1t} \text{ ----(1)}$$

$$\log WP_{(COF)t} = \alpha_o' + \alpha_1' \log X_{(COF)t} + \alpha_2' DPRO_{(Cof)t} + \alpha_3' WS_{(COF)t} + \varepsilon_{1t}' \text{----(2)}$$

Where $\log X_{(COF)t}$ and $\log YW_{(COF)t}$ are endogenous variables, $REER_t$, $DPRO_{(Cof)t}$, $WS_{(COF)t}$ and $YW_{(COF)t}$ are exogenous variables. ε_{1t} and ε_{1t}' are the error terms respectively for the first and second equations. $\log X_{(COF)t}$ and $\log YW_{(COF)t}$ are non stochastic since they depend on the error terms ε_{1t} and ε_{1t}', respectively.

In simultaneous equation model the errors are assume to be correlated across the equations; however the errors of the individual equations are uncorrelated.

That is, $E(\varepsilon_{1t}\, \varepsilon_{1t}') \neq 0$, but $E(\varepsilon_{1t}, \varepsilon_{1t-s}) = E(\varepsilon_{1t}', \varepsilon_{1t-s}') = 0$

Introduction of $\log YW_{(COF)t}$ as an explanatory variable in the first equation in the above model, and $\log X_{(COF)t}$ as an explanatory variable in the second equation would lead to violate the OLS assumption that

$E(\log YW_{(COF)t}, \varepsilon_{1t}) = 0,$

$E(\log X_{(COF)t}, \varepsilon_{1t}') = 0$

Hence applying OLS to the individual equations system will lead to biased and inconsistent estimators[8]. This creates a problem called simultaneous equation bias

Estimation of simultaneous equations coefficients requires getting the reduced form of the model. In the reduced form endogenous variables are explained only by exogenous variables. Since the

[8] Estimators will not converge to their true values as the sample size increases

exogenous variables are not correlated with the error terms in the reduced form, it is possible to apply OLS method of estimation to the reduced form to estimate consistent coefficients. Then the reduced form coefficients can be used to reiterate structural coefficients, which exhibit efficiency and consistency.

The reduced form of the above simultaneous exports equation models can be formulated as:

$$\log X_{(COF)t} = \Pi_{11} + \Pi_{12} \log REER_t + \Pi_{13} \log WP_{(COF)t} \Pi_{14} \log DPRO_{(COF)t} + \Pi_{15} \log WS_{(COF)t} + v_{1t} \text{ ----(1')}$$

$$\log WP_{(COF)t} = \Pi_{21} + \Pi_{22} \log REER_t + \Pi_{23} \log WP_{(COF)t} \Pi_{24} \log DPRO_{(COF)t} + \Pi_{25} \log WS_{(COF)t} + v_{2t} \text{ ----(2')}$$

Where: $\pi_{11}, \pi_{12}, \pi_{13}, \pi_{14}, \pi_{15}, \pi_{21}, \pi_{22}, \pi_{23}, \pi_{24}$ *and* π_{25} are coefficients of the reduced form equations

In the last step, we check the robustness of the cointegration estimates from step three. Since in small sample size FIML, estimates are very sensitive to the specification of the statistical model and the choice of the lag length, we a additionally apply the dynamic OLS (DOLS) procedure developed by Saikkonen (1991). This procedure is asymptotically equivalent to Johansen's maximum likelihood estimator and is known to perform well in small sample. Moreover, DOLS generated unbiased and asymptotically efficient estimates for variables that cointegrate even with endogenous repressors

4.2.6 Testing Cointegration: The Engle Granger Method

We use the Engle -Granger (1987) approach for testing the Null of no cointegration. The null of no cointegration implies that the estimated residuals $\hat{e}t$ are I (1) where as the alternative hypothesis of cointegration implies that the estimated residuals are I (0). Two test statistics are computed to test for no cointegration: the first one is DW statistics from regression, which is commonly known as CRDW. The second is augmented Dickey - Fuller (ADF) t- statistics, which is estimated according to

$$\Delta\hat{e} = \rho\hat{e}_{t-1} + \sum_{j=1}^{k} \Delta\hat{e}_{t-j} + \nu_t \qquad (1)$$

If $t\hat{\rho}$ and CRDW are (in absolute value) greater than the critical values, we reject the null. If we reject the null, then we conclude that the equation under study is a long run equilibrium relationship.

4.2.7 Testing for cointegration: The Johansen Method

We provide additional evidence regarding cointegration by applying the multivariate cointegraion technique developed by Johansen (1995). The Johansen approach estimates cointegration relationship between I (1) series using a maximum likelihood procedure, which tests for the number of cointegration relationships. The method is based on the unrestricted vector autoregressive (VAR (p)) models represented by the following equations.

$$y_t = \mu + \sum_{k=1}^{p} \Pi_k y_{t-k} + \varepsilon_t \qquad (2)$$

Where y_t is (nx1) column vector of (n x1) variables, π_k is coefficient matrix , μ represent a(1xn) vector of constants, p denote the lag length, and ε_t is a disturbance independently and identically distributed with zero mean and constant variance.

Since yt = [.....] is assumed to be I(1). Equation (2) reformulated in vector error correction (VECM) form as:

$$\Delta y_t = \mu + \sum_{k=1}^{p-1} \Gamma_k \Delta y_{t-1} + \Pi y_{t-1} + \varepsilon_t, \qquad (3)$$

Where Γ and π represent coefficient matrices and the rank r of matrix π determines the number of cointegration relationship in the system.

When the rank of Π, r =0 equation (3) becomes a traditional VAR model in first difference.

When the rank of Π>0 indicating that there will exist r<n co integrating relations, meaning r possible stationary linear combinations of y_t. If 0<r<n, the reduced rank matrix Π can be decomposed in to two matrixes α and β each nxr, such that

$$\Pi y_{t-1} = \alpha(\beta' y_{t-1}) \qquad (4)$$

Here the loading matrix α contains the error correction coefficients measuring the speed of adjustment toward equilibrium. The second term on the right hand side $(\beta' y_{t-1})$ represents the cointegration relationships. The cointegrating vector β have the property that $(\beta' y_t)$ is stationary even though yt itself is non- stationary.

The number of cointegrating vectors the cointegration rank, r can be formally tested with the trace and the maximum eigen value statistics.

The trace statistics tests the null hypothesis that the number of distinct cointegration vectors is less than or equal to r against the general alternative of n cointegrating vectors. The maximum - eigenvalue test evaluates the null hypothesis of r cointegration vectors against the alternative of r+1 counteracting vectors.

To determine the optimal lag length, p, the Schwarz information criterion is used. The Schwarz criterion has been shown to choose the correct lag length more often than other information criteria in the VAR processes.

5. Estimation and Interpretation of Results

5.1 Using the Johansen Approach

Before embarking on the Johansen's cointegration test, we run the unrestricted Vector Autoregressive (VAR) technique to obtain the optimal lag length using PcFiml econometrics package. However, since the sample size we employed in this study is small vis-à-vis the recommended by Johansen (1981), we begun from lag 3. The system reduction for data congruency test (see system reduction test result below) revealed that lag 1 is the optimal lag for the data set in all models.

After we had obtained the optimal lag length, the results of $\lambda_{\max}$[9] and λ_{trace}[10] statistics of Johansen and the small sample size adjusted Reimer[11] showed that in virtually all export models that we estimated, there exists a single cointegrating vector. However, we have got also two cointegrating vectors for few of the models. For models we have found two cointegrating vectors,

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[9] $\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{r+1})$, tests the null hypothesis that the number of cointegrating vector is r against the alternative r+1

[10] $\lambda_{trace}(r) = -T\ln(1-\hat{\lambda}_i)$, tests the null hypothesis that the number of cointegratibg vectors is $\leq$ r against the general alternative r=n-1 where $\hat{\lambda}$ is the estimated Eigen values obtained from estimated Π matrix.

[11] To solve the problem of Johansen, which is sensitive to small sample, Reimer (1992), suggested a degrees of freedom adjustment by replacing the degrees of freedom, T in Johansen $\lambda_{\max}$ and λ_{trace} statistics by T-nk where T is the sample size, n the number of variables in the model and k is the lag length in the model

we have estimated the quantities and prices of the principal export commodities using simultaneous equation modeling technique employing full information maximum likelihood estimation and Two Stage Lest Squire technique. Nonetheless, since the correlation between contemporaneous errors in the simultaneous equations did not satisfied the precondition that the correlation between the contemporaneous errors should be at least greater than 0.99, we abscond to use the simultaneous equation modeling technique and recommence estimating the reduced form of each equations specified in theoretical modeling section using a dynamic single equation modeling procedure. In this regard, for all models we estimated, we have employed the two - stage Engle granger error- correction method.

We have indicated below how we did test the data congruency of the system for coffee and chat export equations only since it took space to show for all models considered in the paper. System 3 represents the coffee export system with lag length 3, system 2 with lag length 2 and system 1 with lag length 1. Based on this test, we have obtained the result of the model reduction in the sections (a) and (b) as follows:

i) Progress to date

system	T	p	log-likelihood	SC	HQ	AIC
3	32	16	110.96674	-5.2026	-5.6925	-5.9354
2	32	20	115.07904	-5.0264	-5.6388	-6.1924
1	32	22	119.95407	-5.1144	-5.7881	-6.4971

ii) Tests of system reduction

System 3 --> System 2: F (4, 42) = 1.4399 [0.2377]

System 3 --> System 1: F (6, 40) = 2.1617 [0.0672]

System 2 --> System 1: F (2, 20) = 3.5620 [0.0775]

After we had acquired the right lag length, which is 1 in our case, we carried the Johansen cointegration test for coffee model.

iii) Cointegration Test for exports of Coffee Model

Ho:rank=p	λ_{max}	**Reimer**	**95%**	λ_{trace}	**Reimer**	**95%**
p == 0	43.2**	39.27**	21.0	62.51**	56.83**	29.7
p <= 1	16.82	15.29	14.1	19.31	17.56	15.4
p <= 2	2.496	2.269	3.8	2.496	2.269	3.8

a) Standardized \beta' eigenvectors

LXCOFVt	LDCOFPRODt	LPCOF
1.0000	-1.7063	0.27299
0.43439	1.0000	0.037726
0.089019	-0.20676	1.0000

b) standardized \alpha coefficients

LXCOFVt	-0.77896	-0.48398	0.073401

LDCOFPRODt	0.24585	-0.47148	-0.0067421
LPCOF	-0.22479	0.069430	-0.25312

Since the model reduction result is the same for both coffee and chat models and as we don't have domestic chat production data to incorporate it in the VAR, we have got the cointegration test results for chat export model as follows:

iv) Cointegration Test for export of Chat

Ho:rank=p	λ_{max}	**Reimer**	95%	λ_{trace}	**Reimer**	95%
p == 0	46.16**	43.36**	14.1	62.13**	58.37**	15.4
p <= 1	13.97	12.01	15.8	15.97	15.01	16.8

c) Standardized \beta' eigenvectors

LRXGCHATV	LPCHAT
1.0000	0.29328
0.0079519	1.0000

d) Standardized \alpha coefficients

LRXGCHATV	-1.1173	0.63668
LPCHAT	-0.086350	-0.75665

Number of lags used in the analysis: 1

Variables entered unrestricted:

LRPCONS Constant LREER4 LTOT LREEROA LEXGAP LTRL

5.2 Using the Engle Granger Approach

As we have mentioned above, our data sample are not adequate enough to employ the Johansen multivariate approach even given this problem the estimated cointegtaion vectors for most of the equations is one. Moreover, for those equation we have found two co integrating equations, the correlation between the contemporaneous errors is around 1% which is much more the below the standard value of 99%. As a result, we compelled to use the Engle Granger error correction approach with its limitations in all our equations.

From the unit root test we have undertaken all the variables employed are I (1). Moreover, the results of the Johansen cointegration test although it is not reliable in our case due to shortage of our sample size revealed that most of the models that we have estimated have one cointegration equation.

As result, we have tested the cointegration of variables in all models we have estimated using the two stage Engle-Granger cointegration test for the residual obtained from the long run relation ship of the coffee model.

The Augmented Dickey-Fuller of the two Stage Engle-Granger Cointegration test result for all the models we have estimated showed that although the variables (both the dependent and the explanatory) are I(1), that is, they are not stable individually , their linear relationship is stable

implying that they have long run relationship. (See Annex 4, Annex 7, Annex 10, Annex 13, Annex 16 , Annex 18 and Annex 21) To obtain the optimal lag in the cointegration tests, we have employed model reduction technique using information criterion like the Akaike information criterion (AIC) to decide for the optimal lag length.

5.2.1 Real Exports of Coffee Model

.i) Long Run Real Exports of Coffee Model

$$\begin{array}{lccccc} LXCOFV_t = & 9.12 + & 0.192LREER + & 0.516LWLRT - & 0.336LTOT + & 0.384LRMGINTV \\ (se) & (1.399) & (0.0772) & (0.124) & (0.115) & (0.0921) \end{array}$$

$$\begin{array}{lcc} - 0.366LRFEA + & 0.0914LSTUDIND + & 0.293LAVRF \\ (0.14) & (0.022) & (0.090) \end{array}$$

In the long run equation of real exports of coffee estimated above while real exchange rate, imports of intermediate inputs, number of high school and university students and average rain fall have expected and significant positive impact, foreign exchange rate availability and terms of trade deterioration have negative and significant impact on the long run exports of coffee. Other variables which are incorporated on the theoretical model have been found insignificant and excluded from the long run model.

The positive relationship between real effective exchange rate index which is a measure of competitiveness of Ethiopia vis-à-vis its major trading partners and real exports of coffee showed that real depreciation of Ethiopian birr has a positive and significant impact on Ethiopian major export commodity, coffee.

The positive relationship between coffee export and world lending rate is unexpected since coffee is storable commodity it is believed to be a substitute for financial assets. In this respect, if there is low lending rate, people tends to hold their assets in theses storable commodities hence the demand for coffee will increase. However, some people this result as the positive relationship could be explained as the higher the lending rate leads higher the economic activity through the supply of funds and then the higher will be the demand of coffee.

Coffee is a typical traditional agricultural product whose production and export is highly susceptible to weather condition fluctuations. The positive and significant impact of rain fall is emanated from this association of this commodity with natural phenomenon.

Since all variables are transformed in to log forms, we can interpret the coefficients of the explanatory variables as elasticities, that is, they reveal the 1% impact of the explanatory variables on the dependent variable under study.

In this respect, one can easily infer that in the long run equation of real exports of coffee 1% real exchange rate depreciation leads to 0.2 % increase in real exports of coffee. Similarly, a 1% increase in world lending rate, real imports of intermediate goods, student index and average rain fall have respectively a 0.52,0.35,0.09 and 0.29 percent increase on the real exports of coffee. On the other hand, a 1% increase in deterioration of terms of trade and a 1% increase in foreign exchange availability have respectively a 0.33% and 0.36% decrease in real exports of coffee.

After we estimated the long run export of coffee model, we have tested the stability of the parameters of the model using PcGive econometrics package. The result of the test revealed that

all the coefficients are stable in the long run. The recursive test result of Eviews also confirmed that the coefficients are stable (see Fig 9).

By the same token, the diagnostic test results indicated that the long run equation for real exports of coffee passes all the diagnostic tests. As the sample size is not sufficient to under take hetro X test for tests of hetroschedasticity, we simply reported the simple hetro test and the result showed the model has no hetroschedasticity problem at all common level of significance. (See Annex 4)

ii) Short Run Dynamics for Real Exports of Coffee

DLXCOFVt = - 0.0603 + 0.425DLAVRF + 0.317DLEXGAP + 0.364DLRMGINTV
(se) (0.0335) (0.145) (0.149) (0.103)
+ 0.348LWLRT + 1.03DLELG - 0.0997DLXTRGM_1 + 0.171DLREER - 1.04ECM_1
(0.128) (0.454) (0.0632) (0.113) (0.19)

In the short run dynamic equation of real exports of coffee, exchange rate gap, electricity generation and export tax regime have been found to have significant impact with expected sign. These variables were not significant in the long equation entailing that they have only short run impacts. On the other hand, average rain fall, imports of intermediate goods, world lending rate and real effective exchange rate index have been found to be significant in both long run and short run equations of real exports of coffee.

The estimates of the adjustment coefficient, 1.04 in absolute value revealed that the disequilibrium adjusts towards equilibrium with in the give year by 100%.

The diagnostic test results showed that the short run dynamics for exports of coffee has no problem regarding the plausibility of the classical regression assumptions. The model passes the autocorrelation, the hetroschedasticity , normality and Ramsey specification tests at common level of significant.

5.2.2 Real Exports of Chat Model

i) Long run Exports of Chat Model

$$LRXGCHATV = -26.8 + 0.636LREER4 - 0.084LREEROA - 1.16LEXGAP$$
$$(SE) \qquad (8.07) \qquad (0.282) \qquad (0.0355) \qquad (0.295)$$
$$-1.3LTOT + 1.94LRPCONS + 1.75LTRL$$
$$(0.371) \qquad (1.01) \qquad (0.684)$$

The long run equilibrium equation for real exports of chat illustrated that real effective exchange rate index, total road length and private sector consumption have positive and significant impact on the real export of chat, however, errors and omissions, exchange rate gap and terms of trade deterioration have negative impact on the real exports of chat. While we got expected sign for all explanatory variables, the sign of private sector consumption is unexpected but since its exclusion makes important variables insignificant we retained it in the model for further investigation.

The diagnostic test results as demonstrated above pointed out that the model has no problem regarding the credibility of the classical regression assumptions with respect to normality, autocorrelation, hetroscedasticity and specification tests.

The over all significance test of Wald also displayed that all the explanatory variables are jointly significannt.

ii) Short Run Dynamics of Exports of Chat Model

DLRXGCHATV = +0.192 - 0.401 * DLREEROA + 0.95 * DLREER - 0.318 * DLEXGAP + 0.98 * DLAVRF_1
(SE) (0.121) (0.157) (0.352) (0.118) (0.495)
- 0.136 * DEXCON + 0.674 * DLRMGINTV - 0.924 * ECMCHAT_1
(0.036) (0.308) (-0.134)

In the short run dynamic analysis of real exports of chat, real effective exchange rate index, average rainfall at lag one and imports of intermediate inputs have been found to have positive and significant impact with expected sign. However, on the other hand, errors and omissions, which is dummy for illegal trade and exchange control, have negative but significant impact on exports of chat.

As we have showed in the descriptive analysis part for the market structure of chat, Djibouti and Somalia are the major destinations of exports of this commodity with average share of more than 90%. In addition, these two countries are the major destinations of illegal chat export trade due to the geographic proximity to Ethiopia and the political instability in Somalia. In this regard, although it does not fully denote the illegal trade, the negative sign obtained for errors and omissions, which used for a proxy for illicit trade makes sense especially for this commodity.

The coefficient of lag ECM term of export of chat, 0.924 indicated that more than 90% of the disequilibrium will be adjusted with in the same year.

Like in the long run equation of real exports of chat, diagnostic test results for the short run dynamics of chat as showed above are accepted for all tests.

5.2.3 Real Exports of Oilseeds Model

i) Long run Oilseeds Model

$$\begin{array}{lllllll} LXOSDVt = & -24.1 - & 1.63LEXGAP & -1.62LRPCONS & + 6.03LTRL & + 1.13LAROSD & \\ (SE) & (7.72) & (0.28) & (1.15) & (0.706) & (0.381) & \\ & -3.72LCPINFD & + 0.58LREER & & & & \\ & (0.515) & (0.264) & & & & \end{array}$$

The results of the long run exports of Oilseeds indicated that total road length, real effective exchange rate index and area cultivated by private peasants during meher season have expected positive signs while exchange rate gap, private sector consumption and non food consumer price index have negative and significant impacts on real exports of oilseeds.

The positive tie between real effective exchange rate and real exports of oilseeds can be explained when the real effective exchange rate deprecated, the price of oilseeds will be lowered in foreign currency in the international oilseeds markets as a result the demand for oilseeds will increase. However, since the real depreciation of the Ethiopian birr lowers the price of oilseeds, it also lowers the value of export receipts, which is the product of prices and quantities supplied. Hence, the positive impact of real effective exchange rate is attained when the increasing in

quantity of exports of oilseeds outweighs the price decreasing impact of exchange rate depreciation.

The positive impact of total road length on real exports of oilseeds ,on the other hand, signify that the government investment on expansion of roads has positive contribution on export of oilseeds and helps to the export led development policy of the of the country by facilitating integrations of local grain markets.

Similarly, the positive and significant impact of area cultivated by private peasants during meher[12] season which constitute more than 90% of the total area cultivated in both seasons enlightened that a 1% increase in area cultivation steer to a 1.13% increase in real exports of oilseeds.

On the other hand, the negative and significant impact of the exchange rate gap on real exports of oilseeds indicated a 1% increase in exchange rate gap between the official and the parallel market leads to a 1.63% fall in real exports of oilseeds. This may commence as the increased exchange rate gap result in booming of the illicit trade in oilseeds market and in turn decreases the export of the commodity in the official channel.

When the non-food price index rises, production of these items would increases at the expense of production of food items where an oilseed is one. As a result, supply of this commodity would decline. The causation of private sector consumption on exports of oilseeds arose when domestic private consumption increases, the exports of one of the consumption item would decrease.

[12] Any Crop harvested from September to February is termed Meher Crop. And the season is called Meher Season

i) **Short Run Dynamics of Exports of Oilseeds**

$$DLXOSDVt = -0.021 - 3.28*DLCPINFD + 1.13*DLAROSD + 0.559*DLREER$$
$$(SE) \quad (0.144) \quad (0.968) \quad (0.351) \quad (0.437)$$
$$- 2*DLRPCONS - 1.51*DLEXGAP + 6.2*DLTRL - 0.882*ECMOSD\_1$$
$$(1.06) \quad (0.447) \quad (1.94) \quad (0.217)$$

Unlike the coffee and chat models where long run and short run determinants are not the same, in the export of oilseeds model we have observed that they are the same. This may arise due mainly to the fact that the former commodities are perennial crops while the later is annual crop.

The coefficient of ECMOSD_1, 0.88 divulge that 88% of the short run disequilibrium will come to long run equilibrium with in the given period, which is the year in our case.

5.2.4 Real Exports of Pulses Model

i) Long run Equilibrium Model of Real Exports of Pulses

$$LXPULV = +24.9 - 3.81*LCPINFD - 1.16*LTOT - 3.5*LEXGAP - 2.35*LRFEA$$
$$(SE) \quad (6.75) \quad (0.978) \quad (0.595) \quad (0.794) \quad (1.07)$$
$$+ 4.59*LWCPI + 0.52*LFSLD + 0.704*LITLX$$
$$(1.97) \quad (0.35) \quad (0.328)$$

In the long run equilibrium equations of real exports of pulses since the real effective exchange rate index has found to be insignificant, we incorporated the nominal effective exchange rate, non-food price index and weighted average trading partners' price index. As a result, while nominal effective exchange rate is insignificant, trading partners weighed average price index and non-food price index have been observed to be significant.

Unlike other commodities we have analyzed hitherto , international trade loan for exporters, and domestic fertilizer sold are found to have positive and significant impacts on the long run exports of pulses.

On the other hand, exchange rate gap, foreign exchange rate availability and terms of trade deterioration have negative impacts on the long run exports of pulses.

The negative impact of foreign exchange availability is perhaps due to the fact that if there is high inflow of foreign exchange in the country, it will have exchange rate appreciation impact which in turn deteriorates the international competitiveness of the commodity under study.

The fertilizer sold to domestic market has also found to have positive impact in the long run exports of this commodity as it is the major input that helps to improve the productivity of the commodity and consequently boots the competitiveness of pulses export in the international market.

The positive impact of international trade loan for beginner exporters is expected in Ethiopia as there are complains from beginner exporters that there is shortage of supply of international trade loan from domestic commercial banks although the National Bank of Ethiopia (NBE) has issued an Export Credit Guarantee schemes to encourage banks to provide exporters with short-term credit for working capita requirements relating to exporting of all products other than coffee.

As we have showed in the case of coffee and chat, the broaden gap between the parallel and the official exchange rate tempts exporters to under invoice their export prices to sell the balance in

the parallel market. This will in turn stimulate the flourishing of the illegal trade and consequently the official exports would be under developed.

The diagnostic test results and the stability tests of the estimated parameters are acceptable for the long run real exports of pulses at common level of significance.(See Fig.12)

(ii) Short Run Dynamics of Real Exports of Pulses

$$\begin{array}{lcccccc} DLXPULV = & 0.095 & -1 * DLAVRF + & -2.37 * DLEXGAP + & 2.84 * DLRARPRO \\ (SE) & (0.021) & (0.410) & (0.638) & (0.617) \\ & -1.21 * DLRFEA & -3.35 * DLRPCONS & -1.01 * ECMPUL\_1 \\ & (0.429) & (1.304) & (0.192) \end{array}$$

In the short run dynamic analysis of real exports of pulses we have observed that real agricultural production, which is used to capture the capacity of the agricultural sector and average rain fall have positive impact on real exports of pulses. On the other hand, exchange rate gap, private sector consumption and foreign exchange availability have negative impact on real exports of pulses.

The interpretation of average rain fall, exchange rate gap, foreign exchange availability and private sector consumption is the same as explained in the above section. The real agricultural production has been found to have a significant impact on the short run dynamics of real exports of pulses unlike on the other principal commodities presumably due to this commodity group is a typical agricultural commodity which is highly influenced by the capacity of the agricultural production more than the other commodities considered so far.

The coefficient of the ECM term that measures how quickly the equilibrium stored indicated that the short run disequilibria will be back to equilibrium with in the same year.

5.2.5 Real Exports of Hides and Skins Model

i) Long Run Exports of Hides and Skins Model

LXHS = + 8.372 - 0.44 * LEXGAP - 0.652 * LTOT - 1.08 * LRPCONS + 0.823LTRL
(SE) (4.060) (0.14) (0.226) (0.384) (0.396)

In the long run equilibrium equation for real exports of hides and skins, real exchange rate gap, terms of trade, private sector consumption and total road length has been found significant. While the first three variables affect the real exports of hides and skins negatively, total road length influences it positively. However, since the estimated parameters are not standardized, we cannot say any thing on the relative the contribution of each variable.

The diagnostic test results signify that the long run equilibrium model of real exports of hides and skins has no problem of autocorrelation, hetroscedasticity and specification test. However, the model is not normal at 5% level of significant although it is normal at 1% level. Since normality problem has no impact on the efficiency and consistency of the parameters estimated, we have accepted the model result.

ii) Short Run Dynamics of Real Exports of Hides and Skins

DLXHS = + - 0.131 - 2.195 * DELG - 0.601 * DLEXGAP * -0.65ECMHS_1
(SE) (0.774) (0.054) (0.195) (0.084)

In the short run dynamics of exports of hides and skins as indicated in the equation above, exchange rate gap and electricity generation are the only ingredients that determine the real exports of hides and skins.

Compared with other short run dynamics of the principal export commodities demonstrated before, the adjustment coefficient of the error correction term of the hides and skins is smaller entailing that 65% of short run disequilibria will come to long run equilibrium with in the given year.

5.2.6 Other Real Exports Model

i) Long Run Exports of Other Exports Model

LRXGOTRV= -27.6+0.874*LREER+1.51*LRWGDP+3.92*LELG-0.493*DDRT
(SE) (5.17) (0.14) (0.339) (0.542) (0.187)
-0.756*LTOT
-0.3

As exhibited in the long run equations of other export items, real effective exchange rate index and electricity generation have positively and significant impact. However, dummy for drought, terms of trade deterioration and trading partner's income affect it negatively. As the model we estimated is the reduced form type and it incorporates both the supply and demand factor together, the negative impact of trading partner's income is unexpected as from the demand side of the equation, the real trading partner's income is supposed to influence the real exports of other commodities positively. On the other hand, since other export items are more or less traditional agricultural commodities that could be categorized as inferior goods it may be due to the Engle's law.

ii) Short Run Dynamics of Other Export Items

$$DLRXGOTRV = -0.0766 + 2.58 * DLELG + 0.98 * DLREER4 - 1.34 * DLTOT + 1.07 * DLRARPRO - 0.845 * ECM\_1$$

(SE) (0.0805) (1.27) (0.233) (0.327) (0.592) (0.133)

In the short run dynamic analysis of real exports of other export items while electricity generation, real effective exchange rate index and real agricultural production have been found to have positive effects on the export performance of these aggregate commodity groups, terms of trade deterioration has affected theses items negatively in the short run.

The short run disequilibria will be adjusted to equilibrium by 84% with in the given year. This adjustment showed a modest rate compared with other principal commodity model adjustments indicated above.

5.2.7 Real Exports of Manufactured Exports Model

i) Long Run Exports of Manufactured Exports Model

$$\mathbf{LRXMAN = +0.0685 + 0.25 * LREER - 0.456 * LRWGDP + 0.93 * LELG + 0.547 * LRMGINTV - 0.825 * LTOT}$$

(SE) (5.79) (0.108) (0.213) (0.54) (0.129) (0.232)

Real effective exchange rate, electricity generation and real imports of intermediate inputs are important in the long run affecting the real manufacturing export in Ethiopia positively. On the other hand, real trading partner's income and terms of trade deterioration affects real manufactured exports negatively.

The positive nexus between electricity generation and manufactured exports enlighten us that investment in infrastructure such as electricity generation is vital for the development of real

manufactured exports in Ethiopia. Since electricity supply hamper production efficiency it leads to increasing of real manufactured exports.

The negative relation ship between real manufactured exports and trading partner's income is unexpected at least for these groups of commodities but since it has been found significant and its exclusion made other variables insignificant we keep it in the long run exports of manufacture model.

As we have seen in the descriptive analysis part of this paper, manufactured exports are highly importing intensive. For instance, the import intensity of companies engaged in export markets of these products is 87 percent implying that raw material demand was met from imports. The positive linkage between the imports of raw materials and real manufactured exports is as envisaged. Hence, foreign exchange availability which helps to import spare parts and chemicals for tanning firms are largely important for competitiveness of manufacturing firms in addition to the depreciation of the Birr.

Theoretically, in the case of manufactured exports, the depreciated exchange rate married with the highly inelastic foreign import demand and the associated high import intensity of manufacturing export firms lead to falling of export revenue as firms will be incompetent in the international markets. However, the real effective exchange rate index has been found to be the major factor that affects virtually all models we have estimated so far positively.

In a country like Ethiopia, the deterioration of the terms of trade tightens the foreign exchange constraints which lead to reduce the level of capacity utilization of the country's manufacturing

industries which are highly import intensive. As the majority of manufacturing firms in Ethiopia require some imported intermediate inputs such as raw materials, chemicals, auxiliaries etc, the terms of trade deterioration reduces the efficiency in resource use due to lack of such key imports

The over all significant test statistics, the Wald test, disclosed that the null hypothesis of all variables are insignificant and it has been rejected at all common level of significance denoting that coefficients are jointly significant. (See Annex 23)

The statistics in the diagnostic test result just below the estimated equation indicated also that the long run equation for real exports of manufactured exports comply with the classical linear regression assumptions and the estimated result is as a result acceptable. The null of the normality test is accepted at 1% level of significant unlike other tests such as autocorrelation, hetroschedasticity, and specification tests which are accepted at 5% level.

ii) Short Run Dynamics for manufactured exports

DLRXMAN = - 0.041 + 1.32*DLELG - 0.332*DLEXGAP + 0.367*DLREER
(SE) (0.0448) (0.731) (0.181) (0.135)
- 0.928*DLTOT + 0.28*DLRMGINTV - 1.01*ECM_1
(0.186) (0.121) (0.179)

In the short run dynamics equation of manufactured exports as illustrated in equation above, we have scrutinized that real effective exchange rate, electricity generation and real imports of manufactured goods affected the real manufactured exports positively and significantly, however, terms of trade deterioration and exchange rate gap have been found to be significant and persuade the real manufactured exports negatively.

The coefficients of adjustment in the short run dynamics paraded that the disequilibria will be adjusted to long run equilibrium fully with in the given year. (See Annex 23)

6. Conclusions and Recommendation

This paper attempted to model the principal export commodities of Ethiopia such as Coffee, Oilseeds, Chat, Pulses, Hides and skins, manufactured exports and other exports using the simultaneous equation estimation technique. However, since Ethiopia is price taker in the international commodity market, the demand side of the model did not give us conceivable outcomes. As a result, we compelled to focus on the supply side of the equation but with scrutinizing some demand factors which we believed are important in affecting the real exports of the commodities studied. Thus, the models we estimated could be designated as Error Correction Model of Engle-Granger applied on the reduced form equations for the respective commodities cogitated.

In virtually all commodity models we estimated, export supplies have been found to be driven by natural factors like rainfall in both short and long runs illuminating that the export sector performance is highly vulnerable to environmental shocks.

Unsurprisingly, external shocks such as terms of trade deterioration has been scrutinized to be the fundamental factor in determining the real principal commodities exports of Ethiopia evoking the demand of diversifying the export sector both geographically and commodity wise. Moreover, this result calls up commodity diversification embarked on both horizontally and vertically[13]

[13] Horizontal diversification is when the commodity bundle that the country exports is increasing. On the other hand, vertical diversifications means when the commodity export is transformed to manufactured exports.

Real effective exchange rate index (REER) is one of the variables that have been found significant in all commodities modeled. This calls up the real depreciation of the Birr is imperative for competitiveness of all commodities that Ethiopia is exporting in the international market.

Real intermediate imports which is comprised of raw materials, semi finished goods and capital goods and foreign exchange availability have been found to be significant factor for real exports of Coffee, Chat and manufactured exports. As we have seen in the descriptive analysis part of this paper, manufactured exports are highly import intensive where 87 percent of raw material demands is met from imports. Therefore, the positive linkage between the imports of raw materials and real manufactured exports is as envisaged. Hence, foreign exchange availability, which helps to import spare parts and chemicals for tanning firms, which constitute more than 70% of the manufactured exports, is largely important for competitiveness of manufacturing firms in addition to the depreciation of the Birr.

The relationship between intermediate imports with export supply of Coffee and chat stems from the fact that these commodities are perennial crops which needs relatively long run investment compared with other annual crops. This in turn entails the prominent of importing intermediate goods of the type depicted above. This linkage calls up again the attention of policy makers to give emphases for the imports of intermediate inputs, which have spill over effects on the economic growth of the country. Hence, the scares foreign exchange of the country should be allocated on these kinds of imports instead of luxuries consumption goods, which have no economic growth implication.

The variable representing the influence of the road network on export supply (TRL) has the expected sign for all the commodities but is significant only for Chat, Hides Skins and Oilseeds exports seemingly due to the former two have short life spans after production and hence they need immediate transportation services which is a function of road network to expedition of exports of these commodities to ports.

The negative relation ship between real exports of Coffee and real exports of Hides and skins with exchange rate gap disclosed that when the gap widens export supplies of these commodities will be dropped. In developing countries like Ethiopia where domestic prices have been maintained at lower levels through price regulation trough out half of sample period, the gap between the official and the parallel market foreign exchange rate which is more or less market determined is a good proxy for real exchange rate misalignment. In this regard, when the gap between the two rates broadens, while the illegal markets would be blossoming the official markets for the exports of the commodities considered would be fragile. Hence, this needs the attention of policy makers to follow the course of the development of this important variable so that.

Errors and omissions, which is presumed to be a proxy for illicit international trade, has been found to be significant factor on the real export of chat with negative relationship. Although it is a remote measure of illegal trade as it encompasses other elements such as errors of measurement, which is normal than exception in developing countries' balance of payments data, its relationship with chat export makes sense due to the nature of the commodity under study. A great proportion of Ethiopian chat is produced in the high lands of Harerge, which has geographic proximity with the two countries, which imports more than 90% of Ethiopian chat, Djibouti and Somalia.

Sources from Customs Authority disclosed that an important quantity of chat is send to these countries with illegal channel. This has negative implication on both commodity and exchange rate markets in both countries. Hence, the policy makers in the respective countries should give due emphasis to bring back the illegal market to legal channels.

The positive relationship between fertilizer sold to domestic market and international trade loan for exporters with real exports of pulses provoke export credits *(LITX)* is an important variable explaining export supply of Pulses. In this regard, the National Bank of Ethiopia issued a directive referred as the Export Credit Guarantee schemes to encourage banks to provide exporters with short-term credit for working capita requirements for all export commodities but coffee. However, this directive has not brought sufficient result in stimulating banks to envisage the desired out come as there are complains from exporters that they are not accessing the banks loan satisfactory. Since these credits are important for exporters to enable them buy the commodity from the farmers during production periods, additional incentive mechanism is required from the government to promote the exports of this product.

The negative relationship between domestic private consumption with hides and skins reveal that traditional human consumption of hides and skins for traditional clothing, furnishing and handicrafts hampered the export performance of the sector. Similarly the positive linkage between the real agricultural production and other exports showed the export sector is dependent on the performance of the agricultural activity of the country. The negative relation ship between drought and other export items also signify emerging commodity groups, which are classified under the non principla commodity groups, are also susceptible to natural weather shocks.

The major demand factor, the trading partner's income, has been found not important in persuading the real exports in virtually all commodities studied. Even for some equations the relationship has been found significant, the sign of the relationship was unexpected. In this regard, the theory of trade as engine of growth is not found conceivable at least in the commodities considered. This trifling relationship of income of the trading partners' which are mostly developed as we have showed in chapter two and exports of Ethiopia can be explained by the fact that the preemies of trade as engine of growth is not satisfied. The premise articulate that to exist a stable mechanical relationship between economic growth in developed countries and exports growth in developing countries, there should be very limited substitutability between the products of least developed countries exports and those produced in developed countries. (Lewis, 1980, p.559). However the technological difference between developed countries and primary commodity producing countries like Ethiopia motivate the formers to develop synthetic substitutes for primary commodities. (Kaldor, 1963; Singer 1987; Stein 1999 as cited in Melese Minale, 2004). Lewis 1980 pointed out that the coefficient measuring the impact of a given change in developed countries income on the quantity exported of a given least developed product will be greater if:

- (i) the developed countries share on the developed countries market for the good is greater
- (ii) the lower the elasticity of substitution between competing products in the in the developed countries market;
- (iii) the greater the income elasticity of demand
- (iv) the greater the elasticity of supply of least developed countries commodities and
- (v) the lower the elasticity of supply of competing products

Since the premises of trade as engine of growth and the above five conditions are not satisfied in Ethiopian context, this trifling relationship between incomes of trading partners and real exports of Ethiopian commodities is tolerable.

Similarly, in all the models estimated, the international prices of the respective commodities have not been found significant implying that the international export prices are not important in motivating producers to supply more for export market. This provokes to use the farm gate price in steady of the international prices. However, since time series data of such type are not readily available in the country we forced to drop the variable in all equation we estimated.

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Annex 1 Data Description

The total value of exports of goods (RX) is disaggregated in to export value of coffee (RXGCOFV), export value of oilseeds (RXGOSV), export value of hides and skins (XGHSV), export value of Pulses (RXGPU), export value of Chat (RXGCHATV), and export values of other commodities (RXGOTRV). All nominal export values are deflated by their respective price indices to give real values. The sources these data sets is annual and quarterly bulletins of national bank of Ethiopia

Data on the international prices of the commodities such as coffee, Oilseeds hides and skins is collected from the FAO, Commodity Market Review bulletins and is reported as index with 1980 base year while the international prices of chat and pulses are derived from their respective export unit price indices as their prices are missing in the above publications.

The nominal and real effective exchange rate indices, NEER and REER are obtained respectively by the trade weighted average nominal exchange rate of the Birr against the currencies of Trading partners and adjusting the former index by the price differential between the home economy and the economies of trading partner countries. Mathematically their formulation can be showed in the following way:

$$NEER_t = \left(\sum_{i=1}^{k} \alpha_{i0} E_{it} \Big/ \sum_{i=1}^{k} \alpha_{i0} E_{i0} \right) * 100$$

$$REER_t = \left(\sum_{i=1}^{k} \alpha_{i0} E_{it} \frac{P^*_{it}}{P_t} \Big/ \sum_{i=1}^{k} \alpha_{i0} E_{i0} \frac{P^*_{i0}}{P_0} \right) * 100$$

Where:

NEER = index of nominal effective exchange rate of the home country(Ethiopia)

E = the nominal exchange rate in terms of Birr per unit of foreign currency.

α = is the trade weight attached to partner country i

i = 1,2, ..., k refers to the k trade partner countries

t = refers to time index

0 = refers to the base period

REER = index of real effective exchange rate of the home country.

P^*_i = the price index of partner country i

P = the price index of the home country.

The trade weights where 1% used as cutoff criteria are Belgium (0.0321), France (0.0412), Germany (0.1707), India (0.0382), Italy (0.1298), Japan (0.1218), Kenya (0.0239), Korea (0.0277), Netherlands (0.0389), S. Arabia (0.1628), Sweden (0.0256), Switzerland (0.0170), UK(0.0667), and USA(0.1038). The sources of these data are the National bank of Ethiopia Data base.

The rest of the world variables such as real world income (RWGDP), volume of world coffee export supply (XWCOF), volume of world export supply of hides and skins (XWHS), and volume of world export supply of oilseeds (XWOS) are obtained respectively from IFS, International Financial Statistics data base and FAO, Commodity Market Review, publications with the sample period 1970-2003. The source of other variables that employed in the regression is the national Bank of Ethiopia data base.

Annex 1.1 Variable Definitions

Variable	Description	Source	Unit
AOSD	Domestic Area Cultivated By Private Peasants for Production Of Oilseeds	CSA	103 ht
APUL	Domestic Area Cultivated By Private Peasants for Production Of Pulses	CSA	103 ht
AVRF	Average Rain Fall	Meteorology Enterprise	103 mm
CHATVOL	Export Of Chat Volume	NBE	103 kg
CLOSE	Closed Ness = (GDP/(X+M)*100	NBE	
DCOFPROD	Domestic Coffee Production	MoARD	10^9 kg
COFVOL	Volumes Of Exports Of Coffee	NBE	10^3kg
CPI	Domestic Consumer Price Index (1980/81=100)	NBE	Index
CPIFD	Food Domestic Price Index	NBE	Index
CPINFD	Non Food Domestic Price Index	NBE	Index
DDMKT	Dummy for Market Liberalization	NBE	One for market liberalization and 0 for not
DDRT	Dummy For Drought	NBE	One for drought years and 0 for good years
DEXCON	Dummy Exchange Control	NBE	One for exchange control years and 0 for not
DWAR	Dummy War	NBE	One for war years and 0 for peace years
ELG	Electricity Generation	NBE	10^3 Kilo watt

Variable	Description	Source	Unit
			Hour
EMAN	Values Of Manufactured Exports	CSA	10^6 Birr
ERRO	Errors And Omissions	NBE	10^6 Birr
EXGAP	Exchange Rate Gap	NBE	Unit less
FSLD	Fertilizer Sold	NBE	10^3 Kg
HSVOL	Volumes Exports Of Hides And Skins	NBE	10^3 Kg
ITLX	Internal Trade Loan For Exports	NBE	10^6 Birr
NOMDEV	Nominal Devaluation	NBE	Unit less
OSDVOL	Volume Of Exports Of Oilseeds	NBE	10^3 Kg
PCOF	International Price Of Coffee	UNCTAD and FAO	Index
PHS	International Price Of Hides And Skins	UNCTAD and FAO	Index
POSD	International Price Of Oilseeds	UNCTAD and FAO	Index
PROOSD	Domestic Production Of Oilseeds	CSA	10^6 KG
PROPUL	Domestic Production Of Pulses	CSA	10^6 KG
PSC	Private Sector Credit	NBE	10^6 Birr
RARPRO	Real Agricultural Production	NBE	10^6 Birr
REER	Real Effective Exchange Rate	NBE	Index
RFEA	Real Foreign Exchange Rate Availability	NBE	10^6 US Dollar
RMFGDP	Real Manufactured GDP		10
RNARPRO	Real Non Agricultural Production	NBE	10^6 Birr
RNFA	Real Non Foreign Assets	NBE	10^6 Birr
RPCONS	Real Private Sector Consumption	NBE	10^6 Birr
RWGDP	Real World GDP	IFS	10^6 Birr
RWXC	Real World Exports Of Coffee	UNCTAD, FAO, IFS	10^6 kg
RXCOF	Real Domestic Exports Of Coffee	NBE	10^6 Birr
STUDIND	Student Index (High School +University students)	NBE	Index
TRL	Total Road Length	Total Road Length	10^6 km

Variable	Description	Source	Unit
WCPI	World Consumer Price Index	IFS, UNCTAD	Index
WINF	World Inflation	IFS, UNCTAD	Index
XTRGM	Export Tax Regime	NBE	Index
XWCOF	World Export Of Coffee	UNCTAD, FAO	10^6 kg
XWHS	World Export Of Hides & Skins	UNCTAD, FAO	10^6 kg
XWOS	World Export Of Oils & Fats	UNCTAD, FAO	10^6 kg
WPPUL	World Price Of Pulses	IFS	Index
WLRT	World Lending Interest Rate	IFS	index

After comparing the Augmented Dickey Fuller, ADF and Philips and Peron, PP statistics in Annex 2 below against the Mackinnon critical values provided by the Eviews econometric package, we came out with the following conclusions concerning the unit root tests. Most of the variables are not stationary in their levels, implying the non-rejection of the null hypothesis of non-stationarity. But virtually all variables become stationary in their first differences. This means that they have only a single unit root. A number of variables (LRWGDP, RWXC, and LWCPI) are stationary in their levels. We can not therefore specify the export quantities at their levels without the risk of obtaining spurious regressions unless they are cointegrated. Therefore, since it is necessary to carry out a cointegration test we have under taken the test both using Johansson multivariate approach and the Engle-Granger two stage approach.

Annex 2 : Unit Root Test Results

Variables	Levels		First difference		Order of Integration at 5% level	
	ADF	PP	ADF	PP	ADF	PP
LAROSD	-3.0363	-3.3310	-5.8683	-6.2089	I(0)	I(0)
LARPUL	-2.3257	-3.2425	-5.9143	-10.1013	I(1)	I(0)
LAVRF	-1.6630	-2.9905	-5.5460	-9.2566	I(1)	I(1)
LCPI	-2.0290	-1.3928	-3.2808	-3.9171	I(1)	I(1)
LCPIFD	-1.9633	-1.7966	-1.9899	-3.0674	I(1)	I(1)
LCPINFD	-1.8615	-1.1907	-3.9075	-4.6408	I(1)	I(1)
LDCOFPROD	-2.1824	-3.6564	-6.7833	-10.4301	I(1)	I(0)
LELG	-0.2506	-0.1563	-4.1220	-5.5792	I(1)	I(1)
LEXGAP	-1.9304	-1.5851	-4.3173	-4.1373	I(1)	I(1)
LFSLD	-3.3319	-3.8588	-5.5127	-5.6478	I(1)	I(1)
LITLX	0.0688	-0.1863	-5.5283	-8.4467	I(1)	I(1)
LNEER	-0.6763	-0.6930	-2.7962	-4.3651	I(1)	I(1)
LPCHAT	-1.0850	-2.1307	-5.9326	-11.1023	I(1)	I(1)
LPCOF	-2.2215	-1.9571	-3.8249	-4.8534	I(1)	I(1)
LPHS	-2.2353	-2.3986	-4.7235	-5.9696	I(1)	I(1)
LPOSD	-4.0556	-3.1163	-5.2594	-4.4649	I(0)	I(0)
LPPUL	-5.3415	-4.1629	-6.4484	-6.3777	I(0)	I(0)
LPROPU	-2.5444	-2.4871	-5.8271	-5.6688	I(1)	I(1)
LPROSD	-2.2941	-3.0355	-7.4536	-9.4884	I(1)	I(0)
LPSC	-0.7440	-0.5871	-4.4804	-4.0337	I(1)[14]	I(1)
LRARPRO	-1.1859	-0.8683	-7.6253	-6.4334	I(1)	I(1)
LREER1	-1.4795	-1.3968	-3.9012	-4.8718	I(1)	I(1)

[14] The critical values at the 1%, 5% and 10% levels are: ADF (-3.7497, -2.9969,-2.6381) and PP (-3.7343, -2.9907, -2.6348).

Variables	Levels		First difference		Order of Integration at 5% level	
	ADF	PP	ADF	PP	ADF	PP
LREER2	-0.5356	-0.4824	-2.9705	-4.4498	I(1)	I(1)
LREER3	-1.4775	-1.2990	-4.4498	-4.5593	I(1)	I(1)
LREER4	-1.6244	-1.3139	-4.2943	-4.6431	I(1)	I(1)
LRMFGDP	-0.9871	-0.8344	-4.7356	-4.7721	I(1)	I(1)
LRPCONS	-0.0400	0.7225	-6.9011	-6.5543	I(1)	I(1)
LRWGDP	-4.4498	-4.0449	-2.8360	-2.2353	I(0)	I(0)
LRWXC	-4.4498	-2.3833	-4.8816	-6.4980	I(0)	I(1)
LRXGCHATV	0.2033	-0.0718	-4.9195	-8.7479	I(1)	I(1)
LRXGCOFV	0.2925	0.3802	-5.5747	-8.2778	I(1)	I(1)
LRXGHSV	-0.7640	-1.4534	-4.4416	-7.1659	I(1)	I(1)
LRXGOSV	-1.7774	-1.3975	-5.3441	-4.6947	I(1)	I(1)
LRXGOTRV	-0.1296	-0.3819	-4.3345	-7.6050	I(1)	I(1)
LRXGPULV	-2.1540	-2.1540	-2.1540	-2.1490	I(1)	I(1)
LSTUDIND	-0.8219	-0.8487	-3.9633	-5.4899	I(1)	I(1)
LTRL	-0.5745	-0.2359	-3.8933	-3.8230	I(1)	I(1)
LWCPI	-4.4439	-5.0060	-2.6161	-2.4128	I(0)	I(0)
LWLRT	-2.8413	-1.8156	-4.9283	-4.2340	I(1)	I(1)
LXCHATV	-1.1996	-1.7708	-6.5549	-8.1198	I(1)	I(1)
LXCOFVT	-1.6880	-2.7297	-5.2840	-8.8678	I(1)	I(1)
LXHSVT	-2.8272	-3.3341	-4.9881	-7.7640	I(1)	I(1)
LXMANT	-0.5050	-0.2933	-4.7712	-6.1004	I(1)	I(1)
LXOSDVT	-2.2347	-1.8407	-6.1615	-4.7664	I(1)	I(1)
LXPULV	-2.3807	-2.0781	-4.7752	-5.4586	I(1)	I(1)
LXTRGM	0.5338	0.6656	-3.9384	-5.6128	I(1)	I(1)
LXUVI	-1.8829	-2.0107	-3.0444	-6.3670	I(1)	I(1)
LXWCOF	-0.9916	-1.1414	-6.5258	-8.4976	I(1)	I(1)
LXWHS	-2.1093	-1.5454	-3.5529	-5.6794	I(1)	I(1)

Variables	Levels		First difference		Order of Integration at 5% level	
	ADF	PP	ADF	PP	ADF	PP
LXWOS	0.6766	0.7344	-3.8267	-7.1712	I(1)	I(1)
PCHAT	-2.8177	-4.1594	-4.8728	-8.7968	I(1)	I(0)

Annex 3: Number of Countries Exporting the Principal Commodities of Ethiopia

Year/Commodity	Coffee	Hides and Skins	Oilseeds	Pulses	Chat	Meat.	Fruits	Textile Pro.
1996/97[15]	30	20	11	23	8	5	5	11
1997/98	36	24	20	22	13	5	6	11
1998/99	35	30	20	16	16	5	6	4
1999/00	35	23	20	14	12	3	8	16
2000/01	40	32	30	25	18	2	11	15
2000/02	41	38	36	42	10	7	10	25
2002/03	51	44	36	36	15	7	12	26
2003/04	56	49	42	35	22	12	14	30
2004/05[16]	51	46	50	57	34	9	15	30
2005/06[4]	37	22	36	37	37	9	12	26

Annex 4 Two Stage Engle-Granger Cointegration Test Result of Exports Coffee Model
(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
3	-3.016*	-0.613	0.122	0.576	0.570	-4.06	
2	-3.202*	-0.456	0.120	-0.775	0.445	-4.114	0.5697
1	-5.837**	-0.723	0.119	1.674	0.106	-4.158	0.6374
0	-7.443**	-0.322	0.123	-4.126	0.329		

[15] The number for this year refers the value in the second half of the year,

[16] The number for this year is for the second half of the year.

Annex 5 Estimation Results of Long Run Real Exports of Coffee

	Coefficient	Std.Error	t-value	t-prob
Constant	9.121	1.399	6.520	0.000
LREER	0.192	0.077	2.480	0.020
LWLRT	0.516	0.124	4.160	0.000
LTOT	-0.336	0.115	-2.920	0.007
LRMGINTV	0.384	0.092	4.170	0.000
LRFEA	-0.366	0.141	-2.610	0.015
LSTUDIND	0.099	0.022	4.423	0.023
LAVRF	0.293	0.090	3.245	0.018

R^2	= 0.781003	F(7,26)	= 3.25 [0.000]**
log-likelihood	= 21.5596	DW	= 2.067
AIC	= -3.63550	SC	= -3.27636
HQ	= -3.51302	FPE	= 0.0266087

Diagnostic Test Results

AR 1-2 test:	F(2,24)3.27	[0.0555]
ARCH 1-1 test:	F(1,24)0.12	[0.7316]
Normality test:	Chi^2(2)	0.41 [0.8164]
Hetero test:	F(14,11)	0.24 [0.9928]
RESET test:	F(1,25)0.00	[0.9706]

Individual instability tests:

CONSTANT	LREER4	LWLRT	LTOT	LRMGINTV	LRFEA	LSTUDIND	LAVRF
0.031134	0.028601	0.039585	0.028524	0.033269	0.032804	0.035174	0.031259

Annex 6 Estimation Results of Short Run Dynamics of Real exports of Coffee

	Coefficient	Std.Error	t-value	t-prob
Constant	-0.060	0.034	-1.800	0.086
DLAVRF	0.425	0.146	2.920	0.008
DLEXGAP	0.317	0.149	2.130	0.045
DLRMGINTV	0.364	0.103	3.550	0.002
DLWLRT	0.348	0.128	2.720	0.012
DLELG	1.027	0.454	2.260	0.034
DLXTRGM_1	-0.100	0.063	-1.580	0.129

	Coefficient	Std.Error	t-value	t-prob
DLREER	0.171	0.113	1.510	0.145
ECM_1	-1.040	0.138	-7.520	0.000

R^2	0.649047	F(6,25)	7.706 [0.000]**
log-likelihood	-24.9484	DW	1.54
AIC	-0.841102	SC	-0.520472
HQ	-0.734822	FPE	0.434345

Diagnostic Test Results

AR 1-2 test: F(2,26) = 0.48083 [0.6237]

ARCH 1-1 test: F(1,26) = 0.021311 [0.8851]

Normality test: Chi^2(2) = 3.0080 [0.2222]

Hetero test: F(8,19) = 0.25926 [0.9718]

Hetero-X test: F(14,13) = 0.25015 [0.9925]

RESET test: F(1,27) = 1.1475 [0.2936]

Individual instability tests:

DLAVRF	CONSTANT	DLEXGAP	DLRARPRO	DLRFEA	DLRPCONS	ECMPUL_1
0.0399	0.1648	0.1167	0.1715	0.1049	0.0723	0.2985

Annex 7 Two Stage Engle-Granger Cointegration Test Result of Exports of Chat Model

(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
2	-3.061*	-0.061	0.416	0.199	0.844	-1.634	
1	-3.593*	-0.023	0.409	-0.897	0.377	-1.697	0.8441
0	-6.760**	-0.220	0.407	-1.734	0.669		

Annex 8 Estimation Results of Long Run Real Exports of Chat

	Coefficient	Std.Error	t-value	t-prob
Constant	-26.75	8.066	-3.32	0.003
LREER	0.636	0.282	2.26	0.032
LREEROA	-0.084	0.0355	-2.364	0.718
LEXGAP	-1.158	0.295	-3.93	0.001
LTOT	-1.299	0.371	-3.5	0.002
LRPCONS	1.939	1.01	1.92	0.066
LTRL	1.754	0.684	2.56	0.016

R^2	0.956896	F(6,27)	99.9 [0.000]**
log-likelihood	-16.5828	DW	2.39
AIC	-1.45065	SC	-1.13640
HQ	-1.34349	FPE	0.235820

Diagnostic Test Results

AR 1-2 test:	F (2,25) = 0.91337 [0.4141]
ARCH 1-1 test:	F (1,25) = 0.50513 [0.4838]
Normality test:	Chi^2(2) = 5.2338 [0.0730]
Hetero test:	F (12,14) = 0.41472 [0.9329]
RESET test:	F (1,26) = 0.15579 [0.6963]
WALD test: Chi^2(6)	599.396 [0.0000] **

Individual instability tests

Constant	LREER4	LREEROA	LEXGAP	LTOT	LRPCONS	LTRL
0.061851	0.068332	0.06433	0.022837	0.064289	0.061492	0.060843

Annex 9 Estimation Results of Short Run Dynamics of Real exports of Chat

	Coefficient	Std.Error	t-value	t-prob
Constant	0.192	0.121	1.590	0.125
DLREEROA	-0.401	0.157	-2.550	0.017
DLREER	0.950	0.352	2.700	0.013
DLEXGAP	-0.318	0.118	-2.702	0.029

	Coefficient	Std.Error	t-value	t-prob
DLAVRF_1	0.980	0.495	1.980	0.059
DEXCON	-0.136	0.036	-3.827	0.042
DLRMGINTV	0.674	0.308	2.190	0.039
ECMCHAT_1	-0.924	0.192	-6.870	0.000

R^2	0.811403	F(7,24)	14.75 [0.000]**
log-likelihood	-11.5109	DW	2.13
AIC	-1.61845	SC	-1.25201
HQ	-1.49698	FPE	0.200364

Diagnostic Test Results of the Short Run Dynamics of Export of Chat Model

AR 1-2 test:	F (2,22) = 0.57148 [0.5728]
ARCH 1-1 test:	F (1,22) = 0.36121 [0.5540]
Normality test:	Chi^2(2) = 1.6792 [0.4319]
Hetero test:	F (13,10) = 0.52046 [0.8657]
RESET test:	F (1,23) = 1.2752 [0.2704]

Individual instability tests:

Annex 10: Two Stage Engle-Granger Cointegration

Test Result of Exports Oilseeds Model

(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
2	-2.997*	0.079605	0.3349	-1.176	0.2497	-2.068	
1	-5.626**	-0.18485	0.3371	2.517	0.0178	-2.083	0.2497
0	-4.798**	0.15361	0.3669	-1.943	0.0324		

Asymptotic test: Chi^2(2) = 0.34983 [0.8395]

Normality test: Chi^2(2) = 0.40787 [0.8155]

Annex 11 Estimation Results of Long Run Real

Exports of Oilseeds Model

	Coefficient	Std.Error	t-value	t-prob
Constant	-24.107	7.720	-3.120	0.004
LEXGAP	-1.633	0.280	-5.820	0.000
LRPCONS	-1.619	0.672	-2.410	0.017

	Coefficient	Std.Error	t-value	t-prob
LTRL	6.034	0.707	8.540	0.000
LAROSD	1.130	0.381	2.970	0.006
LCPINFD	-3.717	0.515	-7.210	0.000
LREER	0.580	0.264	2.190	0.037

R^2	0.93662	F(6,27)	66.5 [0.000]**
Log-likelihood	-15.0471	DW	2.06
AIC	-1.54099	SC	-1.22674

Diagnostic Test Results

AR 1-2 test: F (2,25) 3.9197 [0.0331]*

ARCH 1-1 test: F (1,25) 0.0034679 [0.9535]

Normality test: Chi^2(2) 0.40787 [0.8155]

Hetero test: F (12,14) 0.22891 [0.9927]

RESET test: F (1,26) 6.1260 [0.0202]*

Individual instability tests:

Constant	LEXGAP	LRPCONS	LTRL	LAROSD	LCPINFD	LREER4
0.0401	0.08035	0.040414	0.040802	0.041384	0.041648	0.039716

Annex 12 Estimation Results of Short Run Dynamics of Real exports of Oilseeds

	Coefficient	Std.Error	t-value	t-prob
DLCPINFD	-3.278	0.968	-3.390	0.003
CONSTANT	-0.021	0.144	-0.145	0.886
DLAROSD	1.127	0.351	3.210	0.004
DLREER	0.559	0.245	2.280	0.214
DLRPCONS	-1.998	1.064	-1.880	0.073

R^2	0.870083	F(7,23)	22.01 [0.000]**
log-likelihood	-11.3818	DW	1.77
AIC	-1.58744	SC	-1.21738
HQ	-1.46681	FPE	0.206904

Diagnostic Tests of Short Run Dynamics Of Oilseeds Model

AR 1-2 test:	F(2,21) = 3.8481 [0.0377]*
ARCH 1-1 test:	F(1,21) = 0.00052394 [0.9820]
Normality test:	Chi^2(2) = 2.5993 [0.2726]
Hetero test:	F(14,8) = 0.32183 [0.9693]
RESET test:	F(1,22) = 0.046747 [0.8308]

Individual instability tests:

DLCPINFD	CONSTANT	DLAROSD	DLREER4	DLRPCONS	DLEXGAP	DLTRL	ECMOSD_1
0.11468	0.063756	0.1513	0.13463	0.24742	0.029535	0.2332	0.022086

Annex 13: Two Stage Engle-Granger Cointegration Test Result of Exports Pulses Model
(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
3	-4.182**	-0.922	0.596	1.226	0.232	-0.879	
2	-4.543**	-0.536	0.602	1.404	0.173	-0.887	0.232
1	-4.887**	-0.205	0.613	1.896	0.069	-0.88	0.1941
0	-4.650**	0.108	0.642	-0.820	0.089		

Annex 14 **Estimation Results of Long Run Real Exports of Pulses Model**

	Coefficient	Std.Error	t-value	t-prob
Constant	24.887	6.747	3.690	0.001
LCPINFD	-3.808	0.978	-3.890	0.001

LTOT	-1.163	0.595	-2.960	0.042
LEXGAP	-3.504	0.794	-4.420	0.000
LRFEA	-2.355	1.071	-2.200	0.037
LWCPI	4.593	1.965	2.340	0.028
LFSLD	0.520	0.350	3.490	0.015
LITLX	0.704	0.328	2.140	0.042

R^2 0.776572 F(7,25) = 12.41 [0.000]**

log-likelihood -29.4515 DW 1.8

AIC -0.568089 SC -0.205299

HQ -0.446021 FPE 0.572215

Diagnostic Test Results of Long Run Exports of Pulses

AR 1-2 test: F (2,23) = 1.7557 [0.1952]

ARCH 1-1 test: F (1,23) = 0.18966 [0.6673]

Normality test: Chi^2(2) = 4.0012 [0.1353]

Hetero test: F (14,10) = 0.53377 [0.8627]

RESET test: F (1,24) = 1.0055 [0.3260]

Annex 15 Estimation Results of Short Run Dynamics of Real exports of Pulses

	Coefficient	Std.Error	t-value	t-prob
Constant	0.095	0.021	4.477	0.045
DLAVRF	-1.000	0.410	-2.440	0.016
DLEXGAP	-2.365	0.637	-3.710	0.001
DLRARPRO	2.836	0.617	4.600	0.012
DLRFEA	-1.211	0.429	-2.820	0.081
DLRPCONS	-3.352	1.304	-2.570	0.013
ECMPUL_1	-1.006	0.192	-5.230	0.000

R^2	0.53472	F(4,29) = 8.332 [0.000]**
Log-likelihood	-1.06835	DW = 2.12
AIC	-2.48092	SC = -2.25645
HQ	-2.40437	FPE = 0.0838465

Diagnostic Test Results

AR 1-2 test:	F (2,27) = 0.15855 [0.8542]
ARCH 1-1 test:	F (1,27) = 0.068638 [0.7953]
Normality test:	Chi^2(2) = 16.441 [0.043]*
Hetero test:	F (8,20) = 0.70411 [0.6847]
Hetero-X test:	F (14,14) = 0.41271 [0.9454]
RESET test:	F (1,28) = 0.22317 [0.6403]

Individual instability tests:

Annex 16 Estimation Results of Long Run Real Exports of Hides and Skins Model

	Coefficient	Std.Error	t-value	t-prob
Constant	8.372	4.060	2.060	0.048
LEXGAP	-0.444	0.140	-3.170	0.004
LRPCONS	-1.082	0.384	-2.820	0.080
LTRL	0.823	0.396	2.080	0.047
LTOT	-0.652	0.226	-2.890	0.007

Annex 17 Estimation Results of Short Run Dynamics of Real exports of Hides and Skins

	Coefficient	Std.Error	t-value	t-prob
DLELG	2.195	0.774	2.84	0.008
Constant	-0.131	0.054	-2.41	0.023
DLEXGAP	-0.601	0.195	-3.09	0.004
ECMHS_1	-0.65	0.08376	-7.76	0

R^2	0.703205	F(3,29)	22.9 [0.000]**
AIC	-2.92507	SC	-2.74367
HQ	-2.86403	FPE	0.0537253

AR 1-2 test: F (2,27) = 0.58086 [0.5663]

ARCH 1-1 test: F (1,27) = 0.32003 [0.5763]

Normality test: Chi^2(2) = 4.4624 [0.1074]

Hetero test: F (6,22) = 3.4673 [0.1145]

Hetero-X test: F(9,19) = 2.6347 [0.2361]

RESET test: F(1,28) = 2.1057 [0.4579]

Individual instability tests:

DLELG	CONSTANT	DLEXGAP	ECMHS_1
0.0936	0.1328	0.0599	0.53990*

Annex 18 Two Stage Engle-Granger Cointegration Test Result of Other Exports Model

(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
3	-4.507**	-0.80732	0.1644	2.579	0.0162	-3.46	
2	-3.360*	-0.16193	0.1814	0.05772	0.9544	-3.29	0.0162
1	-4.479**	-0.14886	0.178	1.294	0.2065	-3.357	0.0523
0	-4.885**	0.079553	0.1802	-3.363	0.0563		

Asymptotic test: Chi^2(2) = 4.4931 [0.1058]

Normality test: Chi^2(2) = 6.0522 [0.0485]*

Annex 19 Estimation Results of Long Run Real Other Exports Model

	Coefficient	Std.Error	t-value	t-prob
Constant	-27.597	5.171	-5.340	0.000
LREER4	0.874	0.140	6.220	0.000
LRWGDP	-1.514	0.339	-4.470	0.000
LELG	3.922	0.542	7.230	0.000
DDRT	-0.493	0.187	-2.640	0.013
LTOT	-0.756	0.300	-2.520	0.018

R^2	0.931775	F (5,28) = 76.48 [0.000]**	
log-likelihood	-4.73089	DW	2.27
AIC	-2.20665	SC	-1.93729
HQ	-2.11479	FPE	0.110481

Diagnostic Test Results

AR 1-2 test:	F (2,26) = 1.6842 [0.2052]
ARCH 1-1 test:	F (1,26) = 0.33030 [0.5704]
Normality test:	Chi^2(2) = 0.31047 [0.8562]
Hetero test:	F (9,18) = 0.27109 [0.9747]
RESET test:	F (1,27) = 0.24010 [0.6281]

Individual instability tests:

CONSTANT	LREER4	LRWGDP	LELG	DDRT	LTOT
0.036929	0.040248	0.036333	0.036608	0.042207	0.037321

Annex 20 Estimation Results of Short Run Dynamics of Real Other Exports

	Coefficient	Std.Error	t-value	t-prob
Constant	-0.077	0.081	-0.952	0.350

	Coefficient	Std.Error	t-value	t-prob
DLELG	2.585	1.265	2.040	0.051
DLREER	0.980	0.233	4.210	0.000
DLTOT	-1.336	0.327	-4.080	0.000
DLRARPRO	1.074	0.592	1.810	0.081
ECM_1	-0.845	0.133	-6.360	0.000

R^2	0.78655	F(5,27) =	19.9 [0.000]**
log-likelihood	-4.42037	DW	2.09
AIC	-2.20634	SC	-1.93425
HQ	-2.11479	FPE	0.110554

Diagnostic Tests

AR 1-2 test: F(2,25) = 0.61669 [0.5477]

ARCH 1-1 test: F(1,25) = 0.32750 [0.5722]

Normality test: Chi^2(2) = 5.8352 [0.0541]

Hetero test: F(10,16) = 0.43298 [0.9089]

RESET test: F(1,26) = 0.19076 [0.6659]

Individual instability tests:

CONSTANT	DLELG	DLREER4	DLTOT	DLRARPRO.	ECM_1
0.1312	0.17229	0.17969	0.040999	0.06553	0.29599

Annex 21 Two Stage Engle-Granger Cointegration Test Result Manufactured Exports Model

(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
3	-4.507**	-0.80732	0.1644	2.579	0.0162	-3.46	
2	-3.360*	-0.16193	0.1814	0.05772	0.9544	-3.29	0.0162
1	-4.479**	-0.14886	0.178	1.294	0.2065	-3.357	0.0523
0	-4.885**	0.079553	0.1802	-3.363	0.0563		

Asymptotic test: Chi^2(2) = 4.4931 [0.1058] Normality test: Chi^2(2) = 6.0522 [0.0485]*

Annex 22 Estimation Results of Long Run Real Manufactured Exports Model

	Coefficient	Std.Error	t-value	t-prob
Constant	0.068	5.787	0.012	0.991
LREER	0.250	0.108	2.320	0.028
LRWGDP	-0.456	0.213	-2.140	0.041
LELG	0.930	0.540	1.720	0.096
LRMGINTV	0.547	0.129	4.240	0.000
LTOT	-0.825	0.232	-3.550	0.001

WALD test: Chi^2(5) = 724.777 [0.0000] **

R^2	0.962804	F(5,28) =	145 [0.000]**
log-likelihood	12.7433	DW	1.81
AIC	-3.23454	SC	-2.96518
HQ	-3.14268	FPE	0.0395256

Diagnostic Tests

AR 1-2 test: F(2,26) = 0.99491 [0.3834]

ARCH 1-1 test: F(1,26) = 4.5296 [0.0830]

Annex 21 Two Stage Engle-Granger Cointegration Test Result Manufactured Exports Model

(Residual Unit Root Test)

D-lag	t-adf	betaY_1	sigma	t-DY_lag	t-prob	AIC	F-prob
3	-4.507**	-0.80732	0.1644	2.579	0.0162	-3.46	
2	-3.360*	-0.16193	0.1814	0.05772	0.9544	-3.29	0.0162
1	-4.479**	-0.14886	0.178	1.294	0.2065	-3.357	0.0523
0	-4.885**	0.079553	0.1802	-3.363	0.0563		

Asymptotic test: Chi^2(2) = 4.4931 [0.1058] Normality test: Chi^2(2) = 6.0522 [0.0485]*

Annex 22 Estimation Results of Long Run Real

Manufactured Exports Model

	Coefficient	**Std.Error**	**t-value**	**t-prob**
Constant	0.068	5.787	0.012	0.991
LREER	0.250	0.108	2.320	0.028
LRWGDP	-0.456	0.213	-2.140	0.041
LELG	0.930	0.540	1.720	0.096
LRMGINTV	0.547	0.129	4.240	0.000
LTOT	-0.825	0.232	-3.550	0.001

WALD test: Chi^2(5) = 724.777 [0.0000] **

R^2	0.962804	F(5,28) =	145 [0.000]**
log-likelihood	12.7433	DW	1.81
AIC	-3.23454	SC	-2.96518
HQ	-3.14268	FPE	0.0395256

Diagnostic Tests

AR 1-2 test: F(2,26) = 0.99491 [0.3834]

ARCH 1-1 test: F(1,26) = 4.5296 [0.0830]

Normality test:	Chi^2(2) = 6.0522 [0.0485]*
Hetero test:	F(10,17) = 2.3506 [0.0581]
RESET test:	F(1,27) = 1.0492 [0.3148]

Annex 23 Estimation Results of Short Run Dynamics of Real Manufactured Exports

	Coefficient	Std.Error	t-value	t-prob
Constant	-0.041	0.045	-0.916	0.368
DLELG	1.324	0.731	1.810	0.082
DLEXGAP	-0.332	0.181	-1.830	0.078
DLREER	0.367	0.135	2.730	0.011
DLTOT	-0.928	0.186	-4.980	0.000
DLRMGINTV	0.280	0.121	2.310	0.029
ECM_1	-1.013	0.180	-5.640	0.000

WALD test: Chi^2(6) = 107.714 [0.0000] **

R^2	0.805555	F(6,26) =	17.95 [0.000]**
log-likelihood	16.1771	DW	1.93
AIC	-3.39407	SC	-3.07662
HQ	-3.28726	FPE	0.0337922

Diagnostic Tests

AR 1-2 test: F (2,24) = 0.73296	[0.4909]
ARCH 1-1 test: F (1,24) = 7.6868	[0.0706]
Normality test: Chi^2(2) = 5.8761	[0.0530]
Hetero test: F (12,13) = 0.88962	[0.5772]
RESET test: F (1,25) = 0.088759	[0.7682]

Individual instability tests:

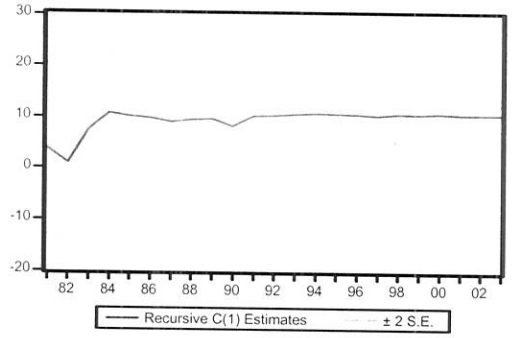
CONSTANT	DLELG	DLEXGAP	DLREER4	DLTOT	DLRMGINTV	ECM_1
0.083811	0.23602	0.21736	0.2267	0.49694*	0.14986	0.017032

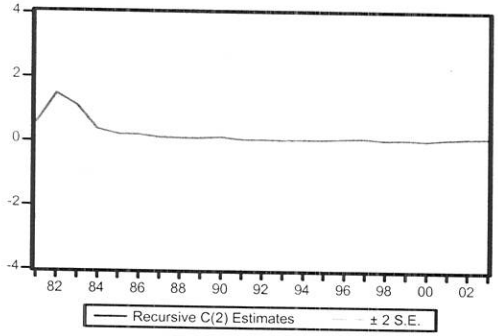
Annex 24 Granger Causality Test Results of Coffee Model

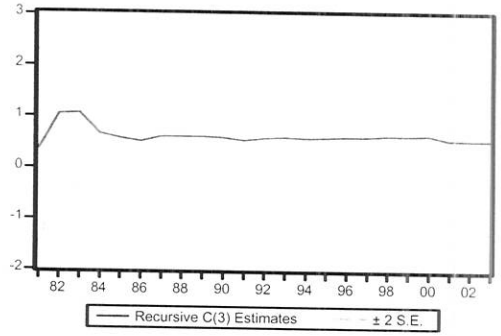
Pairwise Granger Causality Tests
Sample: 1970 2003
Lags: 2

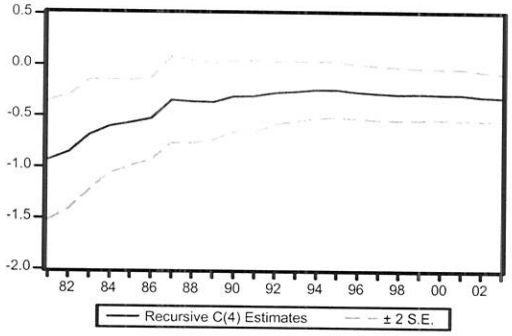
Null Hypothesis:	F-tatistic	Probability	Decision
LREER does not Granger Cause LXCOFVT	1.564	0.023	Reject
LXCOFVT does not Granger Cause LREER4	0.001	0.999	Accept
LWLRT does not Granger Cause LXCOFVT	0.386	0.684	Reject
LXCOFVT does not Granger Cause LWLRT	2.065	0.146	Accept
LTOT does not Granger Cause LXCOFVT	0.338	0.072	Reject
LXCOFVT does not Granger Cause LTOT	1.257	0.301	Accept
LRMGINTV does not Granger Cause LXCOFVT	4.704	0.018	Reject
LXCOFVT does not Granger Cause LRMGINTV	0.495	0.615	Accept
LRFEA does not Granger Cause LXCOFVT	4.912	0.015	Reject
LXCOFVT does not Granger Cause LRFEA	0.108	0.898	Accept
LSTUDIND does not Granger Cause LXCOFVT	2.758	0.081	Reject
LXCOFVT does not Granger Cause LSTUDIND	1.209	0.314	Accept
AVRF does not Granger Cause LXCOFVT	0.432	0.065	Reject
LXCOFVT does not Granger Cause AVRF	1.043	0.366	Accept

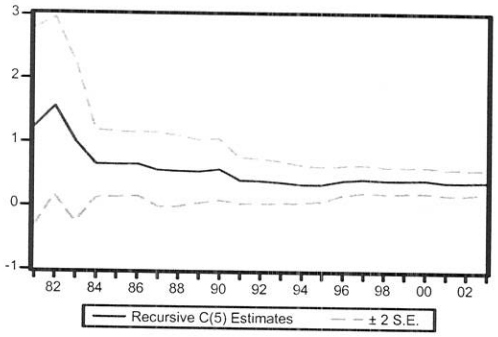
Fig 9: Stability Tests for Long Run Exports of Coffee

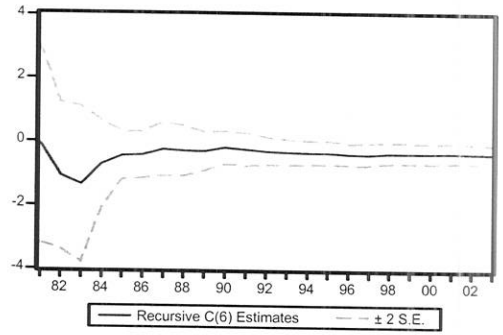


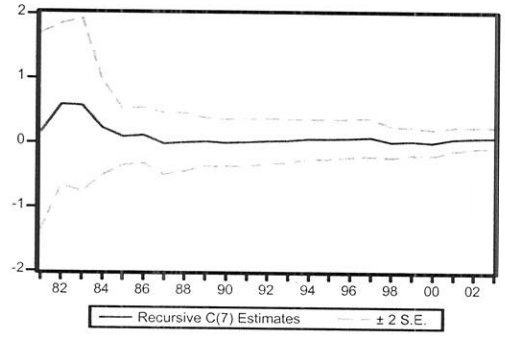




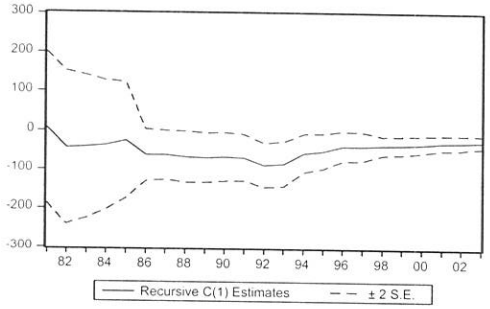


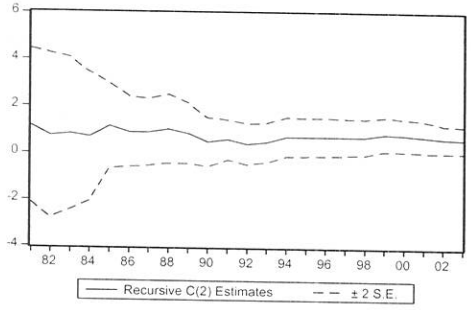


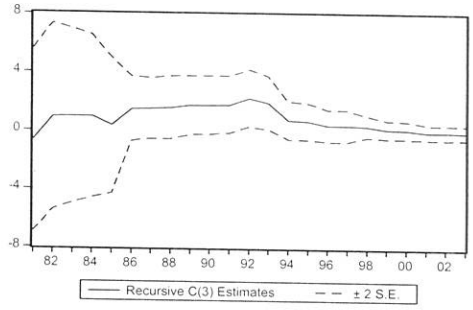


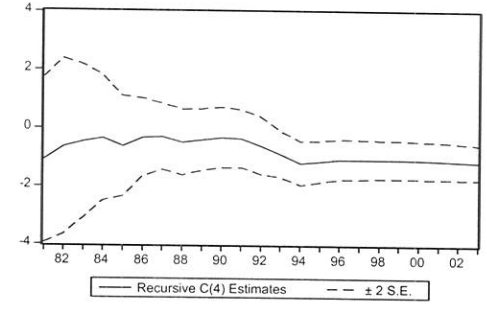


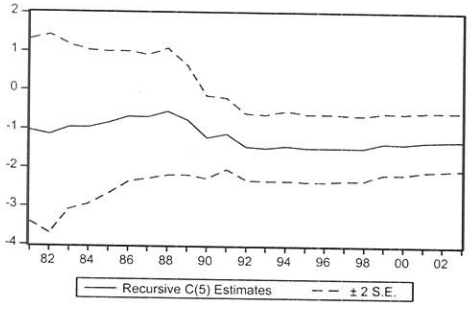
10: Stability Tests for Long Exports of Chat

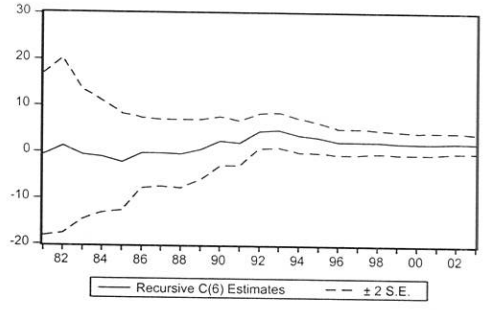


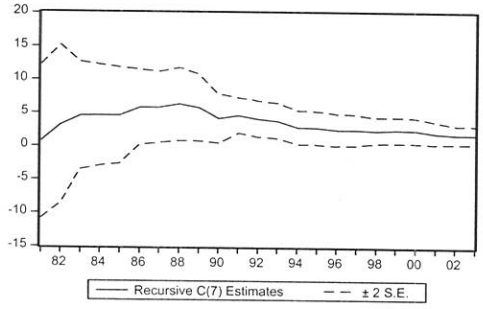




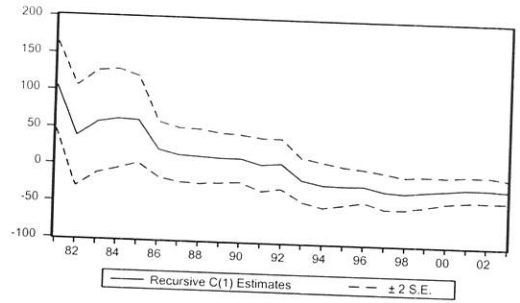


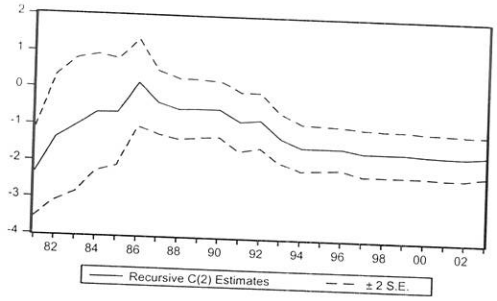


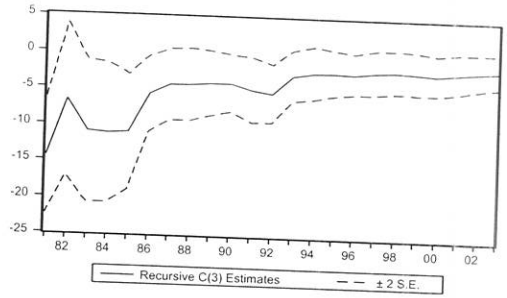


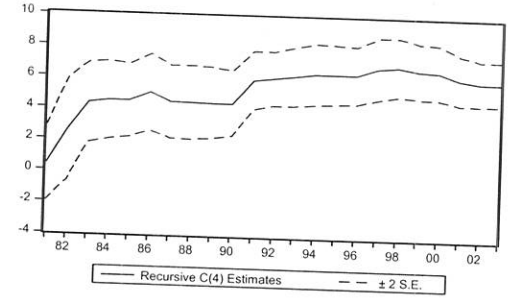


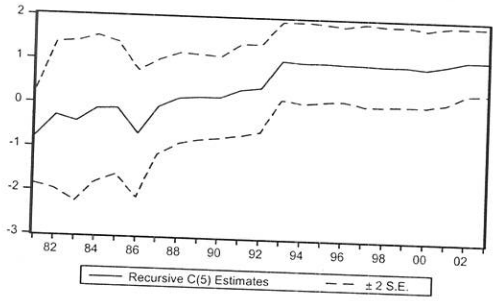
11: Stability Tests for Long Exports of Oilseeds

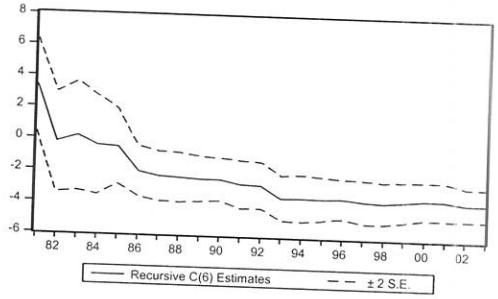


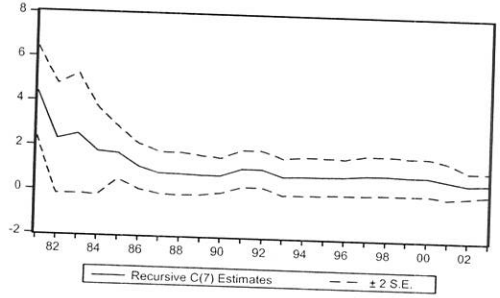












Declaration

I, the undersigned, declare that this thesis is my original work and has never been presented for a degree in any other university, and that all source of materials used for the thesis have been duly acknowledged.

Declared by:

Name: Kassahun Aserra

Signature: [signature]

Date: August 08/2006

Confirmed by Advisor:

Name: Girma Estifanos

Signature: [signature]

Date: August 8/2006

Place and date of submission: August 08/2006 (Addis Ababa)