

**MAJOR AGRICULTURAL EXPORT
ADJUSTMENT FOR CURRENCY DEPRECIATION IN
THE PRESENCE OF EXCHANGE RATE PREMIUM
(1974-2003)**

BY SISAY GUGSA

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**Major Agricultural Export Adjustment for Currency
Depreciation in the Presence of Exchange
Rate Premium (1974-2003)**

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Abstract

The country, Ethiopia, has passed through centrally command economy where resources are mainly produced and allocated (at least conceptually) by the government. Particularly the fixed exchange control system pursued by the former government had a lot of pressure on the economy. Among these the increasingly important share of the black market is one. However, by year 1992 the Transitional Government of Ethiopia (TGE) had took Economic Reform Program. The domestic currency has devalued and further measures are taken that result to depreciation of the birr and reduction of the exchange rate premium. An econometric model, Error Correction Model, is employed to empirically investigate the adjustment of major agricultural exports of the country to currency depreciation in the presence of parallel market. Time-series data (from year 1974-2003) of GDP, parallel exchange rate, official exchange rate, volume and value of major agricultural exports, and CPI are used. The empirical result suggests that exchange rate depreciation that erodes the parallel market premium has significant impact in export performance. The insignificant coefficient of official exchange rate and the significant (negative) coefficient of the premium together tells us that the improvement in export performance was due to the switch of trade from illicit to official channel implying the black market has important share in the country's export. The econometric result also suggests that there is inefficiency in resource utilization. Generally, the pervasiveness of structural rigidities in developing countries, as explained by structuralists that need to be tackled to improve the export performance is emphasized. Therefore, the implication is that complementary measures need to be taken along with the devaluation of the currency in order this measure have significant and positive impact on the country's agricultural export.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Most literatures especially on economic development tells us that most developing countries are highly dependent on agriculture for the source of income. As a result agriculture takes special place in the economic performance of those countries. As Jonston and Mellor (1995) have put, however, diversity among nations in their physical endowment, cultural heritage, and historical context precludes any universally applicable definition of the roles that agriculture play in the process of economic growth. Nevertheless, the history of developed countries tells us that at their early stage of development the share of agriculture to the total output and employment was higher. And these parameters have declined through their economic growth.

If we take the case of developing countries the transformation of these economies is sluggish. Historical data, particularly of Ethiopia, shows that the economic structure is not changing (see Ethiopia An Export Action Program, 1987). Both GDP and source of employment is dominated by agriculture. Almost 85 percent of the labor force is employed in this sector, and it contributes 50 percent to the GDP. Moreover, almost all of the export items are generated from agriculture. The discrepancy in the percentage of labor force employed and its share in the total GDP indicate the low productivity of resources in agriculture.

At different times the Ethiopian governments gave emphasis to increase agricultural productivity. The Arsi Rural Development Unit (ARDU), The Wolaita Agricultural Development Unit (WADU), The Tigray Agricultural Development Unit (TADU), The Minimum package Projects, Participatory Agricultural Development, Extension and Training Service (PADETS), and the current Agricultural Extension Package Program are the main ones. During the imperial regime the implemented area specific programs were successful in increasing agricultural productivity and

production. However, these programs were not replicable due to administrative and cost problems.

After the military government assumes power it took measures that had affected the agricultural sector negatively. Among these policies, which were discriminatory against the agriculture sector, the credit management, the agricultural marketing, and the exchange rate management are some. The monopoly and monopsony effects of the Agricultural Product Marketing Corporation and the immobility of these products have negatively affected price and specialization in that sector. High intervention by the government in purchase and sale of agricultural products makes these commodities to be less priced. For example the Ethiopian coffee marketing corporation (ECMC) took on substantial responsibilities in marketing of coffee, and soon controlled more than 80 percent of officially handled supplies (Stefan D. and Lulseged A., 1994). As a result it is believed that resources move away from agriculture or there was less investment than there had not been futile intervention by the government. The economic performance of the country, as it was the case in the sub-Saharan Africa, was declining through the 1970s and the 1980s. In general, the centrally command economy had negatively affected agriculture hence export performance that is reflected in the stagnation of this ratio over that period (1974-1991).

Learning from past experience and carefully evaluating the current economic environment of the world the government of Ethiopia has started to implement the Structural Adjustment Program in 1992. One of the components of the SAP is devaluing the domestic currency with the ultimate goal of reducing the discriminatory effect, as it is believed by pricist, of the overvalued currency against agriculture and making the economy competitive in the world market.

1.2 Statement of The Problem

The higher demand for imports coupled with the inefficient and discriminatory supply of foreign currency lead to the existence of parallel market for foreign exchange. There are also other factors that contribute to the expansion of this market. This has affected the competitiveness of the economy. As a result the trade balance surplus that was experienced in some of the years during the Imperial government becomes no more attainable during the latter years. To improve the competitiveness of the economy and reduce the external disequilibria the current government has been undertaking the IMF-WB sponsored SAP. One of the program components is devaluation of the domestic currency.

Devaluing currency will increase price of exportable goods in terms of local currency relative to non-traded goods. Conventional economic theory asserts that price and supply have positive relationship. In general, it is expected that resources will move towards the production of exportable goods. Nevertheless opponents of devaluation argue that given the structural rigidity of the economy in developing countries expansion of the trading sector is hard to realize. They add that even the apparent increase in exportable comes from reduction in consumption and diversion of trade away from the illicit channel rather than increase in production. Therefore, to know whether the agricultural sector improves its export performance in response to devaluation and consequent depreciation of currency is a researchable question. Moreover, if there is response, answer for question like whether it comes from production or reduction in consumption and illicit trade is essential.

1.3 Objective of The Study

The questions that have been raised most frequently about the results of structural adjustment programs in Africa are:

- Has growth performance been adequate?
- Has supply response been strong?
- Does investment-to-GDP ratio show improvement?
- Have external flows been excessive?
- Have adjustment policies hurt the poor? (WB regional and sectoral studies)

In this study through investigating the performance of agricultural export for exchange rate movement the effectiveness of devaluation in promoting export is evaluated. Therefore the primary and secondary objectives of the study are:

- To assess the production and market response of the traditional sector to changes in relative price of agricultural products
- To draw some policy implication
- To provoke research on the effectiveness of devaluation on improving aggregate export of the country.

1.4 Hypothesis

In the presence of exchange rate misalignment currency depreciation that is able to reduce the parallel currency premium exerts favorable effect on export performance.

1.5 Scope and Limitations of The Study

To come up with results that enable to attain the stated objectives the study uses secondary data spanning from year 1974-2003. To undertake time-series analysis, such as this one, it is advisable to take longer period than the current study uses. But due to data availability problem on some of the variables the study period is confined to the stated period. Hence, short period analysis is one of the limitations of the study. Moreover, the social and political changes occurred abroad and domestically over the time period may have important implication on the production

and export supply of a given commodity. But the study assumes these to be the same for all the year though it is unrealistic.

1.6 Significance of the study

As indicated in the introduction agricultural output and export constitutes the major component of developing economies. And nowadays it is believed that development would hardly be successful without giving proper attention to the traditional sector in those countries.

The impact of devaluation is economy-wide. Besides, there are other sectoral programs that have important implication on the performance of the agricultural sector, hence export. To measure the separate impact of exchange rate movement on the flow of trade (only export) is difficult as there are other concomitant policy measures.

Given the scope and limitation the study is important since it addresses the economic growth issue as increasing production of exportable crops is the driving force for economic growth, hence industrialization. As the two- sector (labour surplus) model of Lewis reveals, the traditional sector is the source of labour and capital that can be used in advancing the other sectors. Therefore, the study will try to look at how the traditional sector is responsive to relative price changes and will try to recommend policy measures so as to employ resources at best (optimal) use. Moreover, the study will trigger further study on the area.

1.7 Data and methods

Secondary data of yearly frequency (year spanning from 1974-2003) that is collected from MOA, NBE, EEA, MoFED, and UNCTAD is employed in this study. The total number of observation is thirty. The variables that are required are data on official and parallel exchange rate, GDP, officially recorded export of major agricultural products, and price of export. The major agricultural export supplies

considered in this study are coffee, oil seeds, hides & skin, pulses, fruits & vegetables, and chat.

The method used in this study is econometric analysis. That is an error correction model.

1.8 Organization of The Study

This study is organized in six chapters. The next chapter, chapter two discusses the economic performance of Ethiopia relating it to the exchange rate (both official and parallel exchange rate) movement. Emphasis is given to some important agricultural commodities that the country's export. Chapter three is devoted to discuss the theoretical and empirical literatures. In that respect trade theories and their implication, theories on the effectiveness of SAP, particularly devaluation on BoP, and empirical findings on price responsiveness of supply are reviewed. Chapter four tries to explain methods used to evaluate price responsiveness and provides reason to the superiority of ECM over the other supply response models. Accordingly the specified ECM is presented. Using the specified model, data, and an econometric package (PC-Give) results are found and discussed in chapter five. On chapter six summaries of the study, conclusion and recommendations are forwarded.

CHAPTER 2

The Structure and Performance of Agricultural Export of Ethiopia

Primary commodities exporting countries like Ethiopia are subjected to variability on foreign exchange earnings. Instability of price at the world market affects the earnings of these countries especially if they are dependent on exports of few commodities. Therefore, the structure of their export determines their earnings and may affect their growth as the proceeds are used for importing essential investment goods and intermediate inputs, among other benefits of export.

2.1 Pre-Reform Period

This period focuses on the last years of the imperial regime and the whole period of the Dergue regime. During the last years of the imperial government private sector participation in the economy was better compared to the latter, the Dergue, government. The tax and other policy incentives have attracted individuals, especially foreigners, to invest their capital on commercial farms. As a result agricultural products that generates high profit were expanding. This is indicated in the increasing output of exportable, especially oil seeds and pulses. The volume of exports of specific commodities during the last three years of the imperial regime is indicated in the following table.

Table 2.1 volumes of major agr export pre-1974 (in thousand metric tons)

| Year | Coffee | Oilseed | Pulses | Ratio of Total export value to GDP |
|------|--------|---------|--------|------------------------------------|
| 1971 | 79 | 61 | 58 | 0.082239 |
| 1972 | 78 | 76 | 75 | 0.104923 |
| 1973 | 81 | 116 | 111 | 0.120631 |
| 1974 | 62 | 104 | 143 | 0.099334 |

Source: NBE

As presented in the above table the export supplies of coffee, oilseed, and pulses were increasing over the years. The ratio of total export value to GDP was also trending upward indicating the export sector was in a better direction to play its significant role.¹

Despite the recurrent drought and the low productivity of the agriculture, agricultural products continue to dominate export-earning contribution of the country. During 1974-1991, the share of export earning from few products like coffee, skin and hide, chat, and oil seed and pulses ranges from 72.1% to 95.5% to the total export earnings. Coffee alone accounts on average 50-60 percent of export earning. The lowest was recorded in 1974 (27%) that was the time of transition of government. The highest export earning was recorded in 1979 & 1983 during which coffee alone earns 1598 million (88.7%) and 1481 million (82.6%), respectively. This high reliance on few agricultural export made the country's foreign exchange earning vulnerable to price fluctuation. The table below shows the trend of major agricultural export during the Dergue period.

¹ Export will increase specialization, enable to attain economies of scale, reduce domestic inefficiencies, enable transfer of know-how, and is a source of foreign income for financing import.

Table 2.2 volumes of major agricultural export from 1974-2003 (in thousand metric ton).

| Year | Coffee | Oil seeds | Pulses | Fruit & veg. | Chat | Hides & skin |
|------|---------|-----------|--------|--------------|-------|--------------|
| 1974 | 305061 | 213569 | 180397 | 25066 | 13840 | 93348 |
| 1975 | 754972 | 84654 | 126454 | 17994 | 10910 | 104218 |
| 1976 | 1031731 | 71187 | 126413 | 24927 | 17674 | 131202 |
| 1977 | 1256120 | 28184 | 77411 | 10609 | 8799 | 142657 |
| 1978 | 1356436 | 23636 | 43566 | 6552 | 18263 | 250914 |
| 1979 | 1598274 | 32056 | 64767 | 16506 | 45940 | 342983 |
| 1980 | 1315066 | 65593 | 58168 | 13603 | 54378 | 227574 |
| 1981 | 1197186 | 45480 | 69655 | 15223 | 55116 | 225305 |
| 1982 | 1243409 | 38237 | 76470 | 11521 | 84416 | 190774 |
| 1983 | 1481313 | 71449 | 50449 | 15664 | 73679 | 226975 |
| 1984 | 1183596 | 38636 | 45866 | 14821 | 40035 | 234750 |
| 1985 | 631065 | 7686 | 8897 | 6027 | 8477 | 110862 |
| 1986 | 524328 | 9793 | 8481 | 12848 | 28777 | 108291 |
| 1987 | 439305 | 22014 | 16095 | 11520 | 17553 | 133005 |
| 1988 | 626650 | 11030 | 16317 | 8991 | 8336 | 123479 |
| 1989 | 405416 | 8388 | 35609 | 4100 | 21023 | 133298 |
| 1990 | 268451 | 3633 | 15716 | 12001 | 20422 | 92206 |
| 1991 | 168324 | 383 | 386 | 6399 | 5073 | 58645 |

Source : NBE

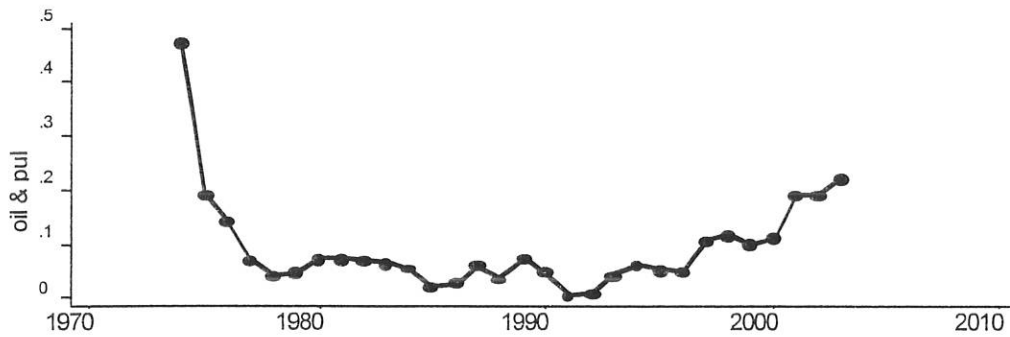
The following graph also shows that there is no marked change in proportions of export earning by major commodities except for the fall in oil seed and pulses proceeds over this period. The reduction on export of oilseed and pulses might be due to the restriction imposed on private individual to participate on economic activities and fragmentation of agricultural land. In contrast to the fall in the share of these commodities in export earning the share of chat has shown an upward trend. The figures 2.1 to 2.4 show how the shares of those commodities behave during the study period.

Figure 2.1 Share of value of coffee export to the total value of agricultural export



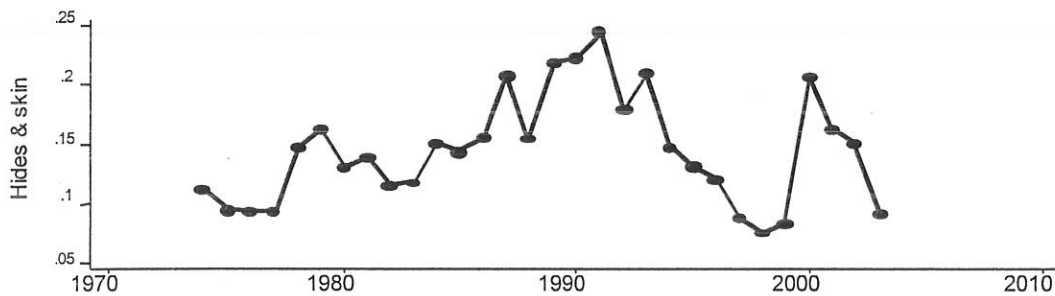
Year

Figure 2.2 Share of value of oil seed and pulses export to the total value of agricultural export.



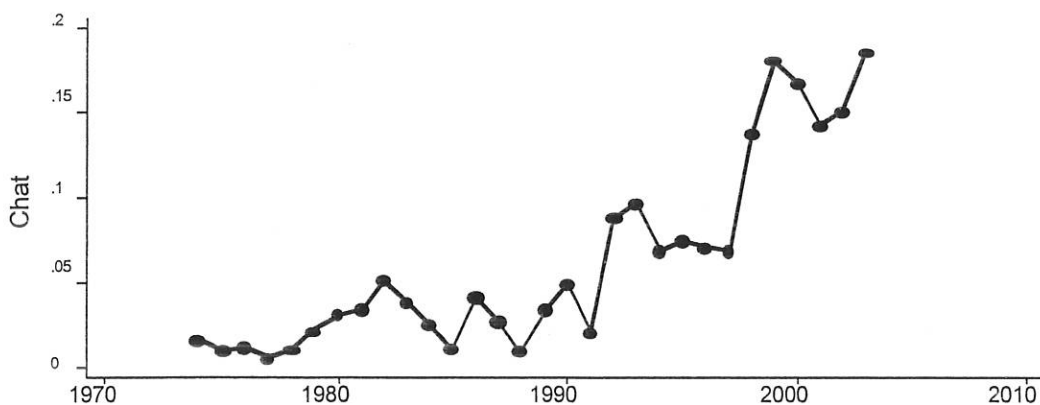
Year

Figure 2.3 Share of value of hides and skin to the total value of agricultural export



Year

Figure 2.4 share of value of Chat export to the total value of agricultural export



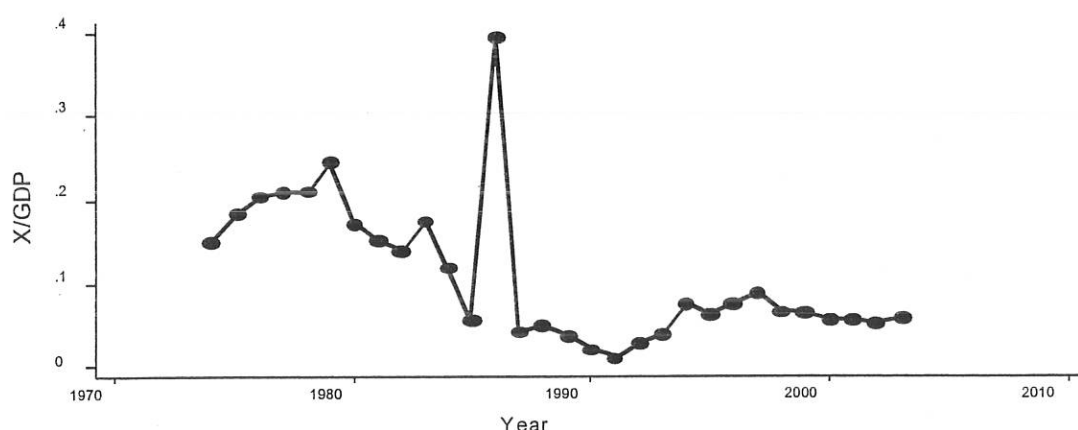
Year

Figure 1 shows the share of coffee to the total agricultural export earning has been greater than 50% during most of the years. The absolute value export earning of oil seed and pulses export earning shows downward movement. As to the share of

hides and skin it does not show any predictable trend. But the share of chat is currently increasing. The increase in export earning from chat is due to the increasing demand from countries like Djibouti, Yemen, and Somalia.

The share of value of agricultural export to the nominal GDP, which is the measure of agricultural export performance in this study, shows a slight increase during the late 1970s. But during the first half of the 1980s this ratio trended downward as indicated by the figure 2.5.

Figure 2.5 share of major agricultural export to GDP.

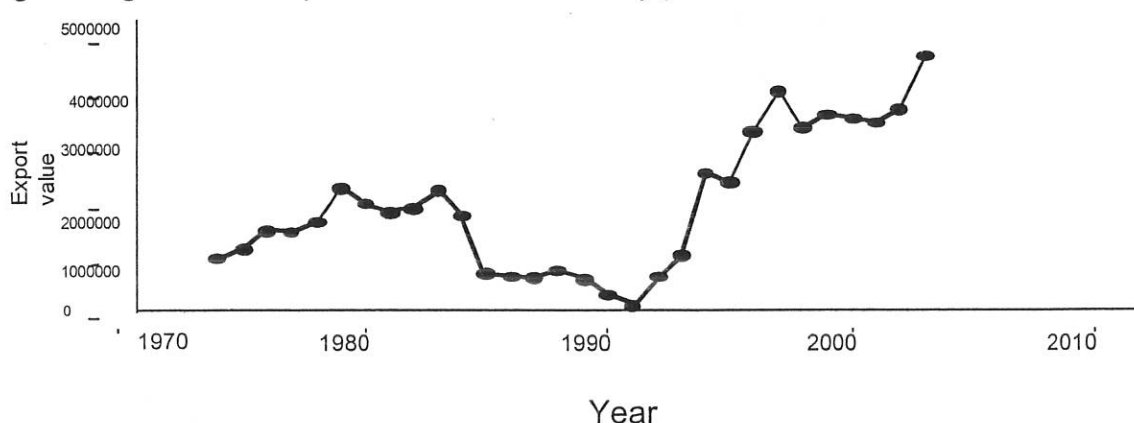


Generally the economic activity of the Dergue period is explained by poor performance. This might be due to, as some economists believe, the wrong policies of the government. The Dergue government (1974-1991) employs centrally command economy that allows high degree of intervention to the market by the government. Price signals were having less, if any, role in allocation of resources. The government was not only wasting resources, since its intervention in the market was beyond economic rationale, but also it employs inconsistent and wrong policies. As explained by Dejene (1995), the adherence of inappropriate policies and lack of timely response and the problems created by such policies gradually compounded shortages drove the economy underground. The underground economy offers large trading margins, which created a new class of speculators and rent seekers. Consequently, the dismal performance of the economy leaves the country to have foreign exchange reserve that lasts only for days despite the positive trade balance (birr 7.6 million) it inherited from the imperial government.

The total export earning from agriculture was growing on an average at a negative rate, i.e. it decrease at a rate of 650 thousand birr per year. The reasons for poor economic performance of that regime are many and interrelated. Abebe, (2000) has summarized into the following: the anti-democratic nature of the Dergue, the civil war, misguided policies, and structural deficiencies with a backward technological base in all sectors and weak inter sectoral linkages.

As a result of the malfunctioning of the economy, the export market share of these agricultural commodities in the world market is still low and the agricultural sector in general is characterized by low market integration and use of backward technology. Take for example coffee. Ethiopia's export share of coffee in the world market is on average around 2 percent. This lowest share has made the country susceptible to the performance of major coffee exporting countries like Brazil, Columbia, and Venezuela. If the supply of these countries falls for some reason Ethiopia will fetch higher price, as a result the export earning increases. On top of this peasants undertake rain fed agriculture the output of which is variable owing to high risk and uncertainty. The low productivity in the sector coupled with recurrent drought has significantly affected the country's export earnings. This decrease in export earning during drought years is indicated on the graph by the slumps over those years.

Fig. 2.6 agricultural export value over the study period



The drought induced famine affects export earnings at least in two ways; directly by affecting the water requirement of the plants and animals sufficient for production and indirectly by impairing the supply of transport facilities and labor

input. Use of inputs like fertilizer is subject to the amount of moisture that the area gets. Decrease in the amount of moisture due to drought, given that the agricultural practice is dominated by rain fed agriculture, affects use of these complementary inputs or if used the output will decrease. On the other hand, during famine transport facilities are campaigned towards relief assistance. This affects the supply of essential inputs like pesticide that are supplied below requirement even at normal periods. The after effect of drought is also significant. Farmers lose their draft animal due to absence of sufficient feed and sale of them to get grain. The number of animals (say goat) required to buy a quintal of grain increases indicating the terms of trade between animals and grain deteriorate during drought seasons.

But there are potentials that the country needs to concentrate on. Among these the country may utilize the low inorganic agricultural inputs used by the farmers to differentiate its agricultural products and as a result to fetch higher and stable price. This inevitably requires persistent promotion work. On the other hand information flow to the farmers and by the same strengthening their bargaining capacity (through forming cooperatives) is essential. Therefore, market integration internally and internationally should be the prime focus of the country whose most agricultural output hence export generates from peasant holdings.

2.2 Post Reform Period

To make comparison on the agricultural exports over the pre-reform and post-reform period, the export volume of these agricultural products over the pre-reform period (1974-1991) average, average of the last five years of the pre-reform period, and the post-reform period (1992-2003) is presented below in table 2.2

Table 2.3 volumes in thousand metric tons of agricultural export by commodity type (post reform period).

| Year | Coffee | Oil seed | Pulses | Fruit & veg. | Chat | Hide & skin |
|--------------------|--------------|--------------|---------------|--------------|-------------|--------------|
| Average | 75288 | 17300 | 38153 | 16329 | 1841 | 10642 |
| 5 year ave. | 68931 | 6566 | 12791 | 27143 | 1165 | 7120 |
| 1992 | 67375 | 392 | 1527 | 6051 | 1936 | 5574 |
| 1993 | 69160 | 10188 | 9840 | 15893 | 2808 | 7807 |
| 1994 | 82199 | 12132 | 25783 | 19485 | 4073 | 8387 |
| 1995 | 97578 | 7832 | 28969 | 19003 | 3699 | 7546 |
| 1996 | 123166 | 14069 | 30468 | 21834 | 5031 | 8638 |
| 1997 | 120050 | 66554 | 30909 | 17010 | 5981 | 7892 |
| 1998 | 101232 | 51365 | 29832 | 19395 | 9702 | 8824 |
| 1999 | 116558 | 43131 | 23527 | 20734 | 15684 | 8604 |
| 2000 | 99134 | 55051 | 26861 | 17030 | 11928 | 12409 |
| 2001 | 110347 | 76604 | 109227 | 29696 | 9377 | 10334 |
| 2002 | 116128 | 72801 | 96154 | 25304 | 6106 | 10545 |
| 2003 | 156408 | 105945 | 73279 | 36844 | 13798 | 9401 |

Source: NBE

Taking the average volume of export over the 1974-1991 and the average volume of export during the last five years of the pre-reform period as a basis for comparison, export supply of coffee takes 3 and 2 years to reach to the above averages, respectively. If we leave the 1990 and 1991 years and compare the volume of export to the year 1989, four years have elapsed to reach or surpass the 1989 level coffee export volume. The number of years that have required for the oil seed is even longer, i.e. six and two years to reach the pre-reform period average and the last five-year average. As to the pulses, fruit and vegetables, and skin and hide it require very long period than either coffee or oil seed. Unlike the other products the export of chat has not been declining hence there was no time elapsed to recover.

Against the picture of overall increase in exports some years after devaluation, there were some redeeming features in the country's export performance. Given the oil seed, pulses, and fruit & vegetables are annual crops and given that coffee is perennial crop one may wonder why these annual crops require a lot of years to recover to their pre-reform period. If there is positive production response for price incentive as the pricist claims, it could have been come, at least initially, from the annual crops. However, the above data does not support this claim.

The current FDRE government and previous TGE had taken measures to redress the failure of the Dergue government there by promising better living standard for its people. ADLI is the foremost development strategy of the country with free market operation. The justifications for market oriented economic policy were two as Abebe (2000) noted: pervasive state intervention in the economic activities is presumed to have resulted in distortion of the economic incentive structure, and the second is conditions of the external factors. These two, the internal and external, factors compel the government to rely on structural adjustment programs (SAP). Research results also support export led growth (see for example Yohannes, 1995): despite the government minimal emphasis on the expansion of the export sector, exports are found to have significant impact on the country's growth process. The structural adjustment program encompasses a wide range of policy measures; among measures devaluation of the domestic currency is one.

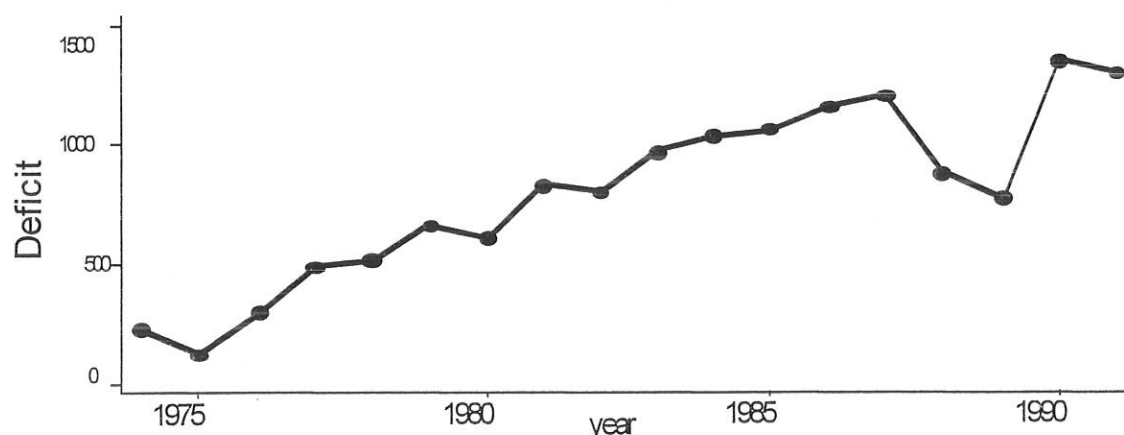
Background to devaluation of the birr.

Over long period the currency of Ethiopia-birr- stayed at a rate of 2.07 in exchange for one USD. Government fiscal deficit financing by borrowing from the NBE coupled with economic inefficiency has fueled the inflationary situation during the Dergue regime. During the last ten years of the former government price was increasing on average at a rate of 7.5² percent per year, which is 8 times greater than during the first ten years of the current government. These are some of the features of the economy during the former government. Some argue that this price increase has priced out some of our export from the international market. As we

² This percentage increase is calculated from general consumer price index.

are price taker in the international market and low utilization of input for the production of our traditional export this argument look absurd. In support of this view some studies indicated that Ethiopia's coffee was competitive. Haile, (1994) on the competitiveness of Ethiopian coffee price relative to Kenya suggests that the Ethiopian coffee is more competitive. On the other hand, the overvaluation of the domestic currency has encouraged smuggling. As a result official exports of the country were financing very little of the import value. The import of the country was growing at a higher rate while our export earning stagnates for the periods under consideration. This has widened the trade deficit gap further that is indicated on the following graph.

Fig 2.7 trade deficit of the country over the study period

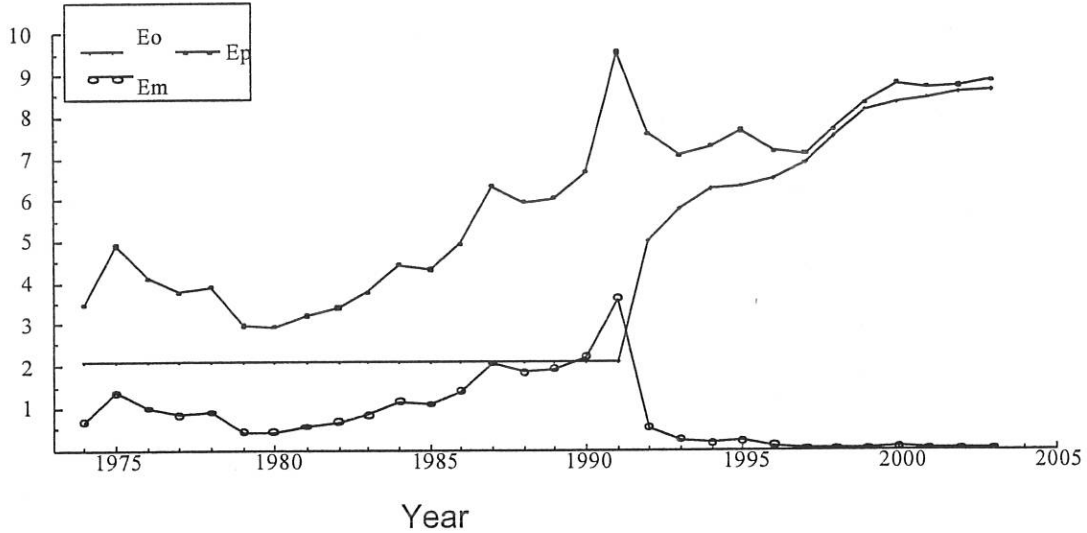


Was the Ethiopian currency (birr) overvalued? To answer this question Haile, (1994) uses partial equilibrium measures: movements in the real exchange rates, relative appreciation of the exchange rate, the behavior of parallel (black) market, relative export competitiveness, and the behavior of past fiscal and monetary policies. On the basis of these measures the study has concluded that all the relevant indicators as a group, but particularly the prevalence of the significant black market premium for foreign exchange, and the fact that the real exchange rate is consistently higher than the nominal exchange rate suggests that the Ethiopian currency (birr) is overvalued.

The prospect of immediate increase in the foreign exchange earnings of exports was one of the main factors in devaluation. It was obvious that its materialization

depended upon several factors such as elasticity of demand abroad for Ethiopian exports, the surplus potential of the country. Nearly 90 percent of the country's export comprised of traditional items, the demand of which is admittedly inelastic. Withdrawal of export tax (except for coffee) and devaluation are expected to encourage the export of these commodities. This may have two effect; an increase in export through official channel by decreasing the incentive to smuggle and an increase in export from increase in production of exportable. Here it would be important to show how maintaining fixed exchange rate for longer time and change in economic environment has affected the exchange rate premium, which is one of the incentive to smuggle. The following graph shows the trend of the exchange rate premium, the parallel exchange rate, and official exchange rate together over the 1974 to the 2003 period.

Fig. 2.8 official exchange rate (Eo), parallel exchange rate (Ep), and currency premium (Em) over the period 1974-2003



From fig 2.5 and fig. 2.8 it seems that the ratio of export to GDP has been moving in the opposite direction to that of the premium. Meaning as the premium starts to rise the ratio of export to GDP starts to decline when the ratio of export to GDP touches its bottom in the beginning of 1990s the exchange rate premium touches its peak. And as the exchange rate premium starts to decline due to the depreciation of official exchange rate the ratio of export to GDP shows a slight upward movement. This might suggest there is some kind of relationship between these two variables that need to be thoroughly investigated.

CHAPTER 3

LITERATURE REVIEW

The different development policies that human beings experienced so far have their root on one or many theoretical considerations, though not solely. These theoretical considerations also based on the underlying situations including resources. Therefore, the success of any development policy depends on the attributes of the resources upon which the policy is designed and careful consideration of them. Hence, in the following paragraphs the different trade theories are discussed followed by discussion on the structural adjustment program and the characteristics of the Ethiopian agriculture from which the highest share of the countries export generates. Lastly, empirical findings on the responsiveness of the agricultural sector to price incentives will be reviewed.

3.1 Theoretical literatures

3.1.1 Trade theories and development

Trade, a means of getting goods in exchange for other goods, had started in a barter time. During that time it requires the simultaneous existence of the two goods to be exchanged. The development of commodity money and latter fiat money has facilitated the trading process. In trade theories there are distinct ideas that have explained how trade benefits the trading partners.

During the mercantilist period trade was viewed beneficial only if it leads to surplus (excess of export over import). Because this enables the country to get more precious metals, such as gold, that will help them to get power by employing more soldier to expand their occupation. The mercantilist thus preached economic nationalism, believing as they did that national interest were basically in conflict (Salvatore, 1995).

Unlike the mercantilists period, nowadays, it is generally agreed that trade will enables at least one of trading countries to consume beyond their autarky that shows an increase in welfare of the societies. But what is the source of trade had

become the central question for trade theorists. In explaining the source of trade Adam Smith's absolute advantage is a pioneer work. Later Ricardo explains that countries need not have absolute advantage over the production of a good in order to trade. He says comparative advantage is sufficient. The similarity of these trade theories is both Smith's and Ricardo's trade theories are one-factor two good and two-country analyses. Moreover, these theories were not able to explore the source of that comparative advantage.

The Heckscher-Ohlin trade theory explains the source of comparative advantage. In its proposition it says a country will produce and export that commodity that uses its abundant resources intensively. Therefore, the source of comparative advantage is factor abundance. This is to mean that labor abundant countries, most LDCs, produces and export goods that uses labor force intensively while capital abundant countries produces and export goods that uses capital intensively.

The factor price equalization theorem of the H-O-S extends the theory to claim that through trade factor prices will be equalized. In other words trade will converge income of peoples.

In contrast to the above income convergence theory there is also a claim that income of the South and North will go further apart. The unequal exchange of Prebisch, in Yutopoulos (1996), argues that the secular terms of trade tended to turn against agricultural products of the South in favor of the Northern industrial trade. This claim is based on the inelastic demand for primary commodities and highly elastic demand for manufactured goods. Improving productivity in the agricultural export goods will increase the supply of the same. Given the inelastic demand for these products the price of them will decrease. As a result of this the developed countries appropriate part of the productivity gain in LDCs, most of whom are primary commodity exporters. On the other hand an improvement in income of LDCs induce them to demand more manufactured goods whose demand is income elastic. In general the terms of trade deteriorate for countries that export primary commodities. The implication is LDCs remain to be poor and

dependent so long as they continue to produce primary commodities for their export earnings.

Yotopoulos (1996) further elaborated the effect of sectoral policies on terms of trade using an extended Lewis-type model and came up with the following four conclusions;

- 1 improvement in productivity in the non-tradable sector in the South improves factorial terms of trade in the South.
- 2 improvements in productivity in the tradable sector in the South imply factorial terms of trade don't change.
- 3 improvements in productivity in the North imply factorial terms of trade deteriorate for the South.
- 4 increases in the power of unions in the North imply factor terms of trade deteriorate for the South.

Interestingly, Lewis (1978a), in Yotopoulos (1996), tried to provide ways of escaping from deteriorating terms of trade. Lewis, in Yotopoulos (1996), suggested that the tropical countries [couldn't] escape from these unfavorable terms of trade by increasing their productivity in the commodity they export, since this will simply reduce the prices of such commodities. --- the factorial terms of trade can be improved only by raising tropical productivity in the common commodity, domestic food stuffs.

Despite some pessimistic view about trade currently there is a widely held view that it is beneficial for trading partners and the benefit from it is sustainably balanced if countries are able and willing to address the deteriorating terms of trade against LDCs. Moreover, there is an understanding that there is bi-directional and long run relationship between export and growth. Empirical findings (for example Anita Doraisami, 1996) also support this view. Therefore, increasing export is expected to improve the well being of the society through its positive impact on economic growth.

3.1.2 The SAP and Trade

Before the 1970s most African economies were performing relatively better. But in the 1980s and afterwards the growth rate was falling, the trade balance was worsening. As a result these countries become highly indebted. The failure of these countries' economic performance is rested on the failure of government policies, as the IMF and WB diagnosed. Survey of the Ethiopian economy (1999) explained the external sector in the African economies remained weak and uncompetitive owing by and large to policy constraints as featured in their highly overvalued exchange rates, restrictive trade policies, government control of markets and prices restrictions and disincentives on private sector participation and lax fiscal and financial discipline which resulted in to severe macroeconomic imbalances.

Hence, the IMF-WB sponsored SAP is trying to reorient the development policies from state-led growth to the 'neo classical' model in which the state's main function is to provide the conditions for market and private enterprise-led growth. Poul Engberg-Pedersen and et.al (1996) wrote structural adjustment involves measures towards market allocation of resources and provide 'enabling environment' for private enterprises. At the center of SAP there is a belief that getting price right would correct the malfunctioning of the economy. Herrick and Kindleberger, 1983, Timmer, 1988 explains that this program base itself on the neoclassical economic thought that price is the best signal for producers to change their level of production. Therefore, it requires discussing how the SAP works. There are theories that explain how the devaluation of currency corrects the balance of payment disequilibrium. Among these theories the elasticity approach and the absorption approach, which are explained by Charles (2000), are presented below.

a) Elasticity approach

The BoP problems are due to the disequilibrium in the physical trade flows, namely exports and imports of goods and services. Thus it could be analyzed on the basis of partial elasticities of the exports and imports and the role of exchange rate in the adjustment of BoP to devaluation.

The role of relative prices and the terms of trade

BoP adjustment through exchange rate changes relies upon the effect of the relative prices of domestic and foreign goods on the trade flows with the rest of the world. This relative price, of terms of trade, is defined by the ratio of export and import price in domestic currency.

From the point of view of the country as a whole, the terms of trade represents the amount of imports that can be obtained in exchange for a unit of exports (or the amount of exports required to obtain one unit of imports). Therefore, an improvement in the terms of trade means that a greater amount of imports can be obtained per unit of exports (or, equivalently, that a small amount of exports is required per unit of imports). The terms of trade may vary both because of a change in prices expressed in the respective national currencies and because of the exchange rate changes.

Depreciation in the exchange rate at unchanged domestic and foreign prices in the respective currencies, in fact, makes domestic goods cheaper in foreign markets and foreign goods more expensive in the domestic market. The opposite is true for an appreciation.

According to the elasticity approach there are two direct effects of exchange rate changes on the balance on goods and services: the volume effect and the price effect. The volume effect is the increase in the volume of exports due to the increase in the price competitiveness of the exports and the decrease in the volume of imports due to the devaluation. Therefore, the volume effect clearly contributes to improving the goods and services account. The price effect is due to the devaluation exports become cheaper measured in foreign currency and imports become more expensive measured in home currency. Therefore, the price effect clearly contributes to the worsening of goods and service account.

The net effect of an exchange rate change on the goods and services account depends upon whether the price or volume effect dominates, especially in

developing countries, which are heavily dependent on imports so that the price elasticity of demand for imports is likely to be very low.

There are two important issues that need to give attention to in analyzing the responsiveness of export and import to devaluation. These are the quantity adjustment period and imperfect competition.

Quantity-adjustment period is defined as a period that both quantities and prices can change. If the suitable conditions on the elasticities are fulfilled, the balance of payments ought to improve. However, it may happen that quantities do not adjust as quickly as prices, owing to frictions and reaction lags of both consumers and investors: it may take time for consumers in both the devaluing country and the rest of the world to respond to the changed competition. Due to these facts the balance of payments again deteriorate before improving towards the new equilibrium point.

As to the imperfect competition, foreign exporters (competitors) may be reluctant to lose their market share and might respond to the loss in their price competitiveness by reducing their export prices. There is a time lag in producer responses: building up a share in foreign market can be time consuming and costly. As a result, the volume of exports may not increase in the short run despite the improved price competitiveness and the current account balance may not improve.

One of the major defects of the elasticity approach is that it is based on the assumption that all other things are equal. However, changes in export and import volumes will by definition have implications for other components of national income. Consequently, income effects need to be incorporated in a more comprehensive analysis of possible BoP adjustments.

b) Absorption approach

The balance of payment problem arises due to the disequilibrium between income and expenditure and has to be analyzed in a broader context than elasticity approach. The absorption approach focuses on the fact that current account imbalances can be viewed as the difference between domestic output and domestic spending (absorption).

$$CA = X - M = Y - A$$

Where CA = current account

X = export

M = import

Y = income

A = absorption

Undertaking how devaluation affects both income and absorption is therefore central to the absorption approach to the balance of payments.

If devaluation effects raises domestic income relative to domestic spending the current account will improve. If, however devaluation raises domestic absorption relative to domestic income the current account will deteriorate. There are two important effects of devaluation on income that need to be examined: the employment effect and the terms of trade effect.

If the economy is below the full employment level, then there will be an increase in net exports following devaluation. As to the terms of trade effect, devaluation tends to make imports more expensive in domestic currency terms, which is not matched by corresponding rise in export prices. This means the term of trade deteriorates. A deterioration of the terms of trade represents a loss of real national income because more units of exports have to be given for one units of import. Hence, the terms of trade effect caused by devaluation, lowers income.

The overall effect of devaluation on income is ambiguous. Thus the overall effect of devaluation through employment and terms of trade on income is ambiguous. Of course, if the economy is in full employment, an increase in income is not possible.

In this case for devaluation to improve the current account deficit it would require a reduction in direct absorption.

Income changes are only one of the factors influencing the current account. The other effects we need to consider are the impacts of devaluation on direct absorption: cash balance (real balance) effect. A devaluation causes an increase in the import prices and hence in the general price level. This brings decrease in the real value of wealth held in monetary form (i.e. the real value of cash balances). The public will try to build up their cash balances in order to restore the real value of these balances, both by reducing absorption and selling bonds. The sale of bonds causes a decrease in their prices, i.e., an increase in the interest rates, which further reduces absorption. Thus the cash balance effect decreases absorption improves the current account balance.

On another effect, assuming that money income and prices increase in the same proportion due to devaluation, real income does not change. But if people do not realize this because they are subject to money illusion, they will change their absorption. The direction of the change depends on the type of money illusion. Thus the effect of money illusion on absorption is ambiguous. Whatever way the money illusion effect works it is unlikely to be significant and is most probably a temporary rather than a permanent factor.

Furthermore, it is possible that economic agents regard the increase in prices induced by devaluation as likely to spark further price rises. This would lead to an increase in direct absorption, which would worsen the balance of payment.

Summing up the effect of devaluation on direct absorption, it is ambiguous. While the cash balance effect works to lower direct absorption all the other effects may raise or lower direct absorption.

Overall, the approach suggests that devaluation will have many diverse and often conflicting effects on the current account. However, the absorption approach has some important lessons for policy makers: its central message is that raising domestic income relative to domestic absorption will improve the current balance.

In this respect devaluation is more likely to succeed if it is accompanied by economic policy measures that concentrate on raising income while constraining absorption.

The two approaches (the elasticity approach and the absorption approach) have remained influential because they contain clear and useful messages for policy makers;

- 1) Devaluation is more likely to succeed when price elasticities of demand for imports and export are high and when it is accompanied by measures such as fiscal and monetary restraint that boost income relative to domestic demand.
- 2) One should not expect devaluation to work in the same manner for all countries; it will in part be determined by whether or not the country is at or below full employment level and on the structural parameters of the economy under consideration.

Nq Yi Chung, (2000) explained that the marshal learner condition is only a necessary condition and *not* a sufficient condition for a fall in exchange rate to improve the balance of trade. In a nutshell, the occurrence of the marshal-learner condition does not mean devaluation of the currency will necessarily improve the BoT. For it to be successful, domestic supply of output must be able to respond to meet the surge in demand caused by the fall of the exchange rate. Spare capacity is needed so that supply can be increased to meet the switching of overseas and domestic demand for locally produced substitutes. This brings us to the issue of using expenditure-reducing and expenditure-switching devaluation as complementary policies rather than substitute policies.

Expenditure reducing effect of devaluation is that it leads to reduction in domestic absorption leaving the income level unchanged. Charles (2000) explained that currency depreciation might be expected to have an expenditure reducing impact, real expenditure reduction will occur only if the appropriate monetary policy is simultaneously pursued. While expenditure switching effect of devaluation is when the price of exportable goods of the devaluing country reduces and as a result foreign consumers switch their consumption towards the export of the devaluing country. And also when domestic producers increase their expenditure on the

production of exportable and import substitutes. As Charles (2002) explained, nominal exchange rate can lead to expenditure switching when they change the relative international price. A traditional argument for flexible nominal exchange rates posits that when prices are sticky in producers' currencies, nominal exchange rate movement can change relative prices between home and foreign goods. But if prices are fixed ex ante in consumers' currencies, nominal exchange rate flexibility cannot achieve any relative price adjustment. In that case nominal exchange rate fluctuations have undesirable feature that they lead to deviation from the law of one price. The case for floating exchange rate is weakened if prices are sticky in this way.

3.1.3 Concerns about the evolution and effectiveness of SAP

Some literatures criticize the SAP not only ignoring to take account of the structural rigidities prevalent in LDCs but also the evolution of the program itself. In evaluating the impact of a given policy or program it is important to see the theoretical underpinning that evolve the policy to happen. Kwanashie et.al (1995) have asked whether the structural adjustment program is an optimal choice and reported the following.

In the absence of a counterfactual analysis of SAP and all its possible alternatives, it would not be possible to rank the alternatives and then determine if SAP is the optimal policy. However, it is possible to if SAP itself was a product of an evaluation of the set of all feasible alternatives. The genesis of SAP indicates two key facts.

- . SAP is a policy conditionally of the World Bank.
- . Both the (Nigerian) government and the World Bank touted SAP as the "only alternative"

The authors then asked "is it possible for a policy to be optimal if the choice set consists only of policy bundles selected by an agent whose objectives are likely to conflict with those of an implementing agent?"

The answer for this question in the authors' words is "*if an overbearing government policy is a constraint to competitive behavior and efficiency, so is a set of*

conditional policies. Just as the government is best that governs least, an external controlling agent is best that controls least”.

There is also a series disagreement about the effect of programs of liberalization in the literature (see for example Alemayehu, 2002). The effectiveness of price in causing changes in the production pattern depends first on the extent to which price changes actually change the relative profitability of different enterprises, and this depends on the physical, technological, and economic nature of the underlying resources. Second, if there are new profitability relationships, whether farmers respond to them depends on their underlying attitudes. In other words, it is often said that devaluation will make our exports cheaper to foreigners and imports most costly to us. As a result export will go up. Whether, in fact, exports will expand and earn more foreign exchange will depend also on a number of other factors; the nature of demand abroad for our products, our ability to increase the availability of goods for export and the difference between our and international prices of our exportable goods. Let us examine these factors.

As to the price differentials there must be adequate availability of supplies for purposes of export which were otherwise also competitive but which were rendered more so by devaluation. However, given stagnant agricultural output over many years, this circumstance is unlikely to be present in the Ethiopian economy. Besides, since we are price taker in almost all of the goods we export there is no incentive to reduce price to attract more demand. Therefore, the factors for expanding our foreign exchange earnings from export boils down in to two; the nature of foreign demand for our exports and ability to expand the production of them. Ethiopian export is dominated by agricultural products, which alone accounted for more than 90 percent of the proceeds of the country (Alemayehu and Berhanu, 1999). The demand for these products is inelastic. Now again expanding our export earning lies on our ability to expand production of them.

3.1.4 Analysis of Resource Utilization in Peasant Farming Setting

Although, farmers have a range of alternative crops they could grow on the same land for simplicity we assume their products are classified into two: exportable crop, and food crops produced for domestic consumption (non-exportable crops). However, the analysis can be extended for product mix, which contain more than two products.

Farmer allocates their resources into cash (including exportable) crops and food crops. Acknowledging that resources are not completely adaptable the technical transformation of goods is concave. Therefore, the assumption of perfect competitive market renders one to assume that there is perfect mobility of resources, flexibility of resource use, perfect information, and the economic agents are rational. As a result producers produce at the frontier implying full employment of resource.

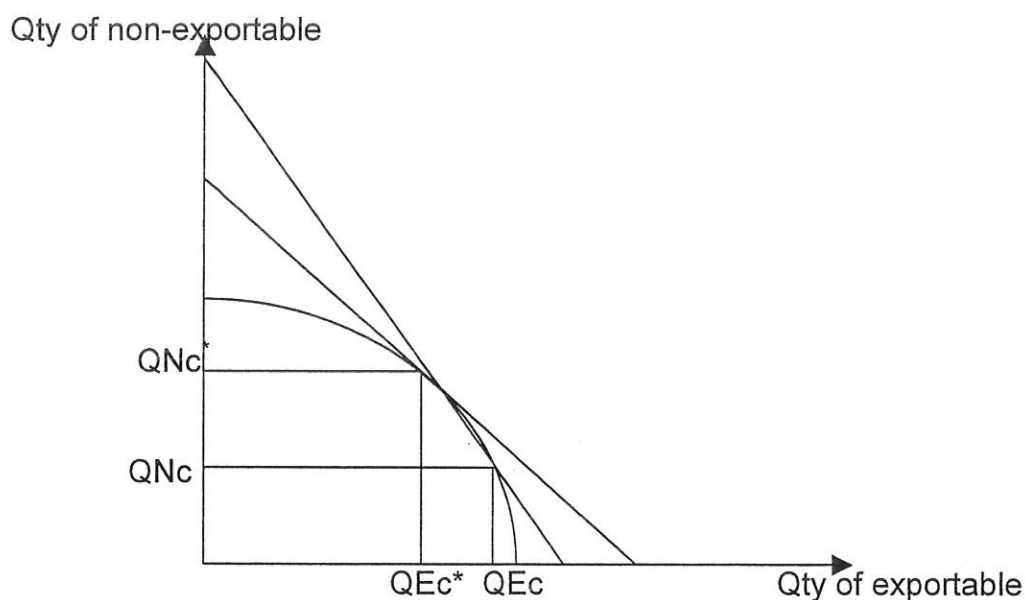
The production options, which are technically feasible, can be illustrated by a production possibility frontier (PPF). This curve depicts the locus of points that combinations of exportable crop and non-exportable crop produced with a set of given inputs and assuming a particular technology. The slope of the production possibility frontier represents the marginal rate of transformation (MRT) of exportable crop for non-exportable crop.

To determine the product mix that will maximize welfare of the economy another information is required-price line. Price line is the ratio of price of exportable to price of non-exportable. Welfare maximization is, therefore, attained at a point of tangency between the production possibility frontier and the highest attainable price line where sets of price lines are superimposed on the PPF.

Now let us see what happens to the production of these product mix if the relative price of exportable good raises say due to devaluation.

The consequence is an increase in the absolute value of the slope of the price line. Hence, it tilts up. The point of tangency is at a lower point of the PPF than before. At this point less of non-exportable good and more of exportable good is produced.

Divergence from the assumption of competitive market would have a different result. For example violation of perfect information means farmers will face the same price line as before. And violation of flexibility of factors of production will compel the producer to produce at the initial point. On a different case let us assume that there is perfect information and factors are mobile between productions but the farmers are living at subsistence and also there is high crop price variability. In such case farmers will attach higher value for production for household consumption. As a result they may not reduce production of non-exportable good to increase the production of exportable good. This can be made clear in the following figure.



Due to devaluation one may expect production of exportable will increase to QEc . But since farmers need to produce QNc^* amount of non-exportable for its subsistence living he/she may not reduce its production.

The microeconomic analysis of farmers' attitude towards increasing labor supply can be explained using the income and substitution effects of relative price change. There are different scenarios; first where farmers consider leisure time as inferior, second where farmers consider leisure time as normal. The increment (decrement) of labor supply depends on the relative magnitude of the substitution and income effects.

In the first scenario if price of their product increases the income effect induces farmers to increase their labour supply. And since the substitution effect reinforces the income effect, the total effect is an increase in labour supply, hence output, assuming the marginal product of labour is positive. However, in the second scenario where leisure time is considered to be normal, the income effect reduces their labour supply but the substitution effect induces them to supply more labour. The total effect depends on the relative magnitude of the two effects. If the income effect is greater than the substitution effect the total effect is reduction in labour supply. Otherwise there will be an increase in labour supply.

Frank Ellis, 1988 summarizes peasant economic models in to five: the profit maximizing peasant, the risk-averse peasant, the drudgery-averse peasant, the farm household peasant, and the sharecropping peasant. The profit maximizing peasant and the farm household peasant models predicts that peasants are price efficient that depend on competitive markets. In the absence of competitive market the predictions of these theories must be modified to take account of the nature and impact of market imperfections. On the other hand the risk-averse peasant, the drudgery-averse peasant, and the sharecropping peasant models are based on imperfect, incomplete, or missing markets. *These are true peasant theories in the sense of our peasant definition.*

In an underdeveloped economy the peasant farm is the exclusive institutional type for vast areas and population. Decisions regarding major consumption expenditures such as housing tend to conflict directly with decisions concerning productive investment in the farm business (J.W.Mellor, 1968). This implies an error, which is unfortunate to the farming business, tends to be unfortunate to the participating family as well. The peasant agriculture is also characterized by low

levels of utilization of certain resources, low level of productivity, and relatively high level of efficiency in combining resources and enterprises. J.W.Mellor (1968) explained that these three factors are interrelated and collectively they suggest that there is little scope for rapidly increasing either total production or productivity per unit of the resources with in the context of a traditional agriculture but very great scope for increasing total production and resource productivity through technological change.

3.1.5 the structuralists' synthesis

The above argument may point that there are structural rigidities in peasant farming setting. In reinforcing the Structuralists' view that price incentive has less impact in LDCs if it is not accompanied by non-price incentives, Yotopoulos (1996), by forwarding the asset-value dynamics hypothesis, argues that in an open economy LDC, there is a systematic incompleteness in the foreign exchange market. Two of the factors that account for this incompleteness are; 1, the non-separation between tradable and non-tradable is special characteristics of LDCs, 2, the distinction between hard and soft currencies and the tendency of the latter to be chronically undervalued in a regime of exchange rates with an open capital account.

The systematic relationship between tradable and non-tradable introduces a systematic component in the devolution of the real exchange rate as development occurs: it tends to appreciate. In the interim, and in the stage of underdevelopment, the low productivity in tradable tends to be compensated by high nominal exchange rate (NER) that makes inefficient production profitable and draws resources away from the non-tradable sector (Yotopoulos, 1996). This study have great implication on the sequencing and intensity of openness for the currently undertaking SAP in LDCs to furnish economic growth.

The above points suggests that agricultural output will hardly increase, through price incentive, given the backward agriculture that the country is undertaking. Given the structural rigidities prevalent in developing countries it is heroes to believe that price will play the important role (Dejene, 1994). The overall effect of

devaluation may be contractionary depending on the relative magnitude it exerts on tradable and non-tradable. For others trade flow is even beyond the control of these developing countries. That is there are external factors beyond the reach of these countries.

Thus the above theories indicate that anything can happen with respect to the response of agriculture to price incentive in LDCs. It indicates that increase in export of agriculture might be shifting of trading channel from unofficial to official. Therefore, the responsiveness of agricultural export to price incentive is an empirical question.

3.2 Empirical literatures: *Agricultural output Responsiveness To Price Incentive.*

A World Bank Policy Research (1994) conducted explains that countries that have undertaken and sustained policy reforms, adjustment is working. The Bank has taken twenty-nine African countries that have undertaken the adjustment program and classified into 1) countries with large improvement in macroeconomic policies 2) countries with small improvement in macroeconomic policies and 3) countries with deterioration in macroeconomic policies. After making group comparison the Bank reported that of the twenty-nine countries, the six with the most improvements in macroeconomic policies between 1981-86 and 1987-91 enjoyed the strongest resurgence in economic performance. The report explains further that they experienced a median increase of almost 2 percentage points in the growth rate of gross domestic production (GDP) per capita, bringing their median rate of growth up from a negative level to an average of 1.1 percent a year during 1987-92. The increase in their industrial and export growth rate was even more striking. The report in general departs that policy reforms paid off in higher growth rates in income, exports, industry and agriculture.

Another analyses made on seven countries also reinforced the World Bank findings discussed above. There was an increase in growth and supply response was positive indicating that African farmers do respond to price incentives and allocate labour to activities yielding better returns (W.B Ishrat H. and Rashid F., 1994).

However, the categorization of countries into the adjusting and the non-adjusting is not clear. Paul Mosley (1994) pointed out that the 'non-adjusting' countries carried a great deal of adjustment. There was enormous variation in the packages prescribed.

Alemayehu (1999) studied the effect of trade liberalization on the coffee sub-sector. The study outlined a number of approaches in the evaluation of the impact of Bank fund supported programs in general and trade liberalization in particular. Although it has no mechanism to filter out the effect of other factor than the reform, as explained by the same author, he has chosen the 'before-after' approach to evaluate trade liberalization effect in Ethiopia and at times it resort to the econometric analysis. This approach compares the performance of the economy before and after the introduction of that policy, in this case SAP. The study has come up with the conclusion; the level of export (both in quality an quantity), area under coffee cultivation, private participation in the process and marketing of coffee have increased due to SAP. He has added, however, trade liberalization scheme does not enhance the competitiveness of Ethiopia's coffee in the international market. Ethiopia's share in the world market is still too small to bring about such an effect. This may point to the fact that price liberalization by itself may not bring about changes in the coffee sub-sector and, hence, needs to be accompanied by supply side policies.

The agricultural export performance of Ethiopia, measured in the ratio of export to GDP, shows a declining trend during the past three decades. The constraints of this sector that have long lasting influence are summarized in WB (1987) and presented as follows. These constraints are categorized into policy constraints, other internal constraints, and external constraints.

Policy constraints include: exchange rate; taxes; pricing of exportable. While other internal constraints include: investment; capacity utilization; transportation; domestic absorption; inadequate skills in international marketing and trade promotion; input supply; shortages of basic consumer goods in rural areas

The external constraints are: availability of external markets; threat from international protectionism; declining terms of trade.

World Bank (1987) has estimated export supply function and found that export taxes, export prices and changes in the real exchange rate have substantial influence on exports. A real appreciation of exchange rate by 10 percent would lead to a decline in exports of nearly 2 percent while an increase of 10 percent in export taxes would lead to a 3 percent fall in exports. The price elasticity of export is 0.12 percent. Also, exports are shown to rise with increases in production in the economy roughly on a one-to-one basis. The important conclusion from this analysis is that the exchange rate, export taxes, and export prices are important determinants of export performance, and should be set at appropriate levels in order to support production and generate an exportable surplus. However, a sustainable supply response would require increased supply of production inputs and invest able resources.

Stefan D. and Lulseged A (1994) has made studies on coffee prices and smuggling in Ethiopia during 1966/67 – 1992/93. The study uses log-linear approximation in estimating the market supply function using data on supply of coffee, official and black market price of coffee and price of chat.

The study has the following findings. A ten percent increase in the black market coffee price relative to the official price will reduce supplies in the official market by 1.1 percent. The implication of the result, as described by the authors, is first that the black market may not have been as large as it sometimes thought. During the period 1976 to 1991 the share of total marketed production, which went to the black market, is estimated at about 10 to 15 percent. While this is significant and even if the resent reforms and further devaluation will succeed in making the black market unattractive, its effect on exports and on the trade balance will remain relatively small.

Since the study is limited to one product and since the price of related goods is included in the model the analysis is a relative supply response (not an aggregate supply response).

To measure the “switching effect” between the official and the black market the authors include the ratio of coffee price in the black market to its price in the official market. Eventhough the inclusion of this explanatory variable in the study context cannot be claimed erroneous, in the aggregate supply response analysis it is appropriate if one includes exchange rate premium to measure such “switching effect”.

In contrast, the result of Mulate (1992) is pessimistic on the effect of exchange rate on output and export. He used two methods: group comparison and regression analysis. Taking 30 sub-Sahara Africa countries and he grouped them into A) significantly depreciating exchange rate (at 10% or less) B) insignificantly depreciating exchange rate C) significantly appreciating exchange rate and D) insignificantly appreciating exchange rate.

The study came up with the findings that despite significant devaluation, agricultural export grew by negative rate in Madagascar, Mauritania and Tanzania while increasing by an average of 20.8 percent in Rwanda, a country with significant currency appreciation. If allowance is made for some extreme observations (i.e. dropping some countries from the group), insignificantly depreciating countries will emerge as the best performers in terms of output and exports. Then the study concluded on the basis of the group finding comparison, one can thus infer that undertaking substantial initial devaluation, as recommended by the IMF and the World Bank, may not be wholly beneficial. The study further explores the effects of exchange rate adjustment using a regression analysis. The regression analysis, like the results from the group comparison, failed to substantiate the view that real exchange rate depreciation will positively and significantly affect exports and output.

These pooled data analysis and the ‘with’ and the ‘without’ policy analysis ignores country heterogeneity. Besides, it does not indicate to which country the result should be applied for.

Yoseph, (1994) has also studied the supply response of coffee. The study used a log-linear model where coffee arrival is taken to be dependent on price, lagged arrival, Institute of Coffee Organization (ICO) quota allotted for Ethiopia, shocks due to changes in the government and changes in the marketing system. The study estimates the elasticity of coffee supply to the auction price of year 1965/66 – 1992/93 to give some implication for the SAP in Ethiopia. Its major finding is that coffee arrivals during the study period cannot be explained by the price variables.

As to the specification since the country's agriculture is highly affected by weather condition it would be misspecification not to include a variable that can capture this effect. Besides, acknowledging that the SAP has economy-wide effect, the elasticity of one commodity is unlikely to capture the essence of the programme.

In studying Government policies, real exchange rate and agricultural exports Alem (1995) has included an arithmetic mean of the inflation corrected exchange rate of the birr vis-à-vis the Kenyan shilling, the Djibouti franc, the Sudanese pound, and the Somali shilling. This variable was taken as a proxy for incentives to border trade. The regression result shows that the real exchange rate depreciation vis-à-vis neighbouring countries has the expected sign but not significant implying that the official exports do not increase due to reduction in smuggling arising from the relative depreciation of the real exchange rate of birr.

The inclusion of this variable (the arithmetic mean of inflation corrected exchange rate of birr vis-à-vis the neighbouring countries currencies) implicitly assumes that the incentive for smuggling is only due to profit differentials. However, this assumption can be erroneous knowing that there are other factors. The reason for smuggling among others includes capital flight, to finance import, and expected benefit by holding foreign currency. Therefore, it would be appropriate if the overvaluation of the exchange rate were expressed in terms of the major currencies, like the USD.

Therefore, the current study will have the following contribution to the issue in question.

- 1) In a policy analyses that have economy wide impact such as devaluation it is not appropriate to evaluate with single commodity supply response. Hence, the current study focuses on aggregate supply response of some primary commodities.
- 2) The static expectation assumption of the partial adjustment model, which is employed by most studies, is one of the limitations of the Nerlove supply response model. By using the ECM the current study will reduce the biased ness of the estimates.
- 3) In many empirical literatures the role of currency premium on smuggling is overlooked. However, in the current study this is emphasised.
- 4) Omission of non-price factor on the outcome of the econometric analysis is misspecification. Hence, in this analysis effort is forwarded to show this effect.
- 5) And the time period is longer than the previous studies.

CHAPTER 4

MODEL SPECIFICATION

Most supply response studies done so far use Nerlove partial adjustment with adaptive expectations. There are also theories that explain peasant supply response under shortage (take for example David B. and et.al 1989). Nerlove's supply response model expresses long run equilibrium or desired supply (q_t^*) as a function of expected price (p_t^e) Nerlove (1958a), in Wickens and Greenfield, (1982) is presented as follows.

$$q_t^* = \alpha + \beta P_t^e \dots\dots\dots(4.1)$$

A simple partial adjustment model relating desired to actual supply (q_t) can be:

$$q_t - q_{t-1} = \lambda(q_t^* - q_{t-1}); 0 \leq \lambda \leq 1 \dots\dots\dots(4.2)$$

And adaptive expectations model relating expected to actual price (p_t):

$$P_t^e - P_{t-1}^e = \theta(P_{t-1} - P_{t-1}^e); 0 \leq \theta \leq 1 \dots\dots\dots(4.3)$$

If $\theta = 1$, the expected value adjusts period by period to current observation and all previous history is irrelevant.

If $\theta = 0$, an expectation once formed continues unchanged irrespective of current or earlier observations.

The immediate and more realistic case of being θ a positive fraction means that the expectations get adjusted each period by some proportion of the discrepancy between the latest observation and the expectation for that period. Therefore, high value of θ implies slowly changing expectations.

From the above three equations the following supply function is obtained

$$q_t = \alpha\theta\lambda + \beta\theta\lambda P_{t-1} + \{(1-\theta) + (1-\lambda)\}q_{t-1} - (1-\theta)(1-\lambda)q_{t-2} \dots\dots\dots(4.4)$$

Wickens and Greenfield (1982) have objected the above supply function explaining that it is based upon a set of ad hoc behavior relationships in which the distinction between the investment and the harvesting decision [is] suppressed, as a

consequence the desired supply function fails to capture adequately the distributed lag response of coffee supply to past investment.

For the remedy of the above objection they suggested to specify the structural relations that drive the reduced form supply function. However, they came up with a similar equation. Wickens and Greenfield (1982), most studies of investment in tree crops use Nerlove's model together with an adaptive expectations model relating expected to actual price. Although this formulation is ad hoc, its widespread use over more than a decade testifies to its value. An alternative formulation derived from an optimizing model has been shown to be very similar to Nerlove's.

Zealelem (1997), after specifying the production relationship and the profit function and maximizing the profit subject to the constraint has also come up with a similar supply function (except for the inclusion of many variables) to that of the Nerlove's supply function.

To estimate the effect of exchange rate adjustment on export performance the study will use an econometric analysis. The model is adopted from Zealelem (1997) who undertook a study on the adverse effect of large exchange rate misalignment on official export using pooled data of 13 sub-Saharan Africa countries.

The model extends the export supply function in the theoretical-simulation framework in Agenor et al (in Zealelem, 1997). The model assumes a small country economy that renders the foreign price of traded goods invariant with the exchange rate and export output supply determined. In such an economy neither its supply of export nor its demand for imported goods affects world price. Exchange rate control is also the other feature of this economy, which creates an underground economy. This underground economy requires foreign exchange. The parallel market exchange rate will increase, as the underground economy demands excess foreign exchange. The premium of exchange rate induces exporters to switch their export to the unofficial market and to under invoice their exports.

Therefore, a model that incorporates the above features of an economy was developed by Zelealem defining agricultural export performance (the ratio of agricultural export to GDP, both variable in nominal terms) being a function of price index of export, expected price of export, capacity gap, price of import, domestic interest rate, exchange rate premium, official exchange rate, credit supply for the export sector, and lagged export.

$$\log X_o = \beta_0 + \beta_1 \log P_x^* + \beta_2 \log P^e + \beta_3 \log Y_G + \beta_4 \log P_n^* + \beta_5 i_o + \beta_6 \log(E_p / E_o) + \beta_7 \log E_o + \beta_8 \log CRDT + \beta_9 \log X_{o(-1)} + u$$

Where P_x^* = price index of agricultural export

P^e = expected price index of agricultural export

Y_G = excess capacity

P_n = price index of imported intermediate input

i_o = interest rate

E_o = official exchange rate³

E_p = parallel exchange rate

CRDT = credit supply for export sector

X_o = the ratio of agricultural export to GDP both measured in current local currency

U = an error term

The model does not have variable that captures the effect of weather on agricultural export. One may argue for the inclusion of this variable. However, the presence of capacity gap variable and the nature of the dependent variable (which is the ratio of agricultural export to GDP) would rescue from such criticism. Since the dependent variable is measured in relative terms, in the Ethiopian context it may be reasonable to assume that both the numerator (agricultural export) and the denominator (GDP) are affected similarly leaving the ratio the same, therefore, ignore the 'weather' effect.

However, the Nerlove's partial adjustment model with adaptive expectation is also criticized on its static expectation assumption towards which the adjustment is made. This problem can be solved by error correction model (ECM). The main

³ Exchange rate in this study is defined as the amount of local currency required to purchase a unit of USD.

attributes of ECM are it clearly shows how the short run adjustment is made towards the long run equilibrium. Besides within this framework, Hallam and Zanoli (1993) have demonstrated the relevance of the ECM to agricultural supply response, and how it avoids the partial adjustment's unrealistic assumptions of a fixed target supply based on stationary expectations (Abdulahi and Reider, 1995). In ECM the terms representing the extent of deviation from equilibrium are explicitly present in the estimated equation, and which therefore immediately displays information about the adjustment that a process makes to a deviation from some long-run equilibrium.

Moreover, in a time series analysis, if the dependent variable is correlated with time, including the lag of the dependent variable as an independent variable gives high values of R, which may indicate presence of spurious regression. This problem can be solved using two methods; differencing the variable until it becomes stationary or expressing the variables relative to appropriate scale variables (see for example Ibrahim E., 1998). The former is used in the current study.

The autoregressive distributed lag (ADL) model, from which the ECM is derived, is described as follows.

If a lag distribution applies to every variable in the model, the long run effect must be derived as a function of all the lag distributions (Banerjee et.al.,1993).

$$y_t = \delta_o + \delta_1 y_{t-1} + \beta_o x_t + \beta_1 x_{t-1} + e_t \dots\dots\dots(4.5)$$

The long run values are given by the unconditional expectations of the form E(y_t) in 1 above

Defining E(Y_t)=Y* and E(X_t)=X* for all t.

And E(e_t) =0

$$y^* = \alpha_o + \alpha_1 y^* + \beta_o x^* + \beta_1 x^* \dots\dots\dots(4.6)$$

$$y^* = \frac{\alpha_o + (\beta_o + \beta_1)x^*}{(1 - \alpha_1)}$$

$$E(y_t) = k_0 + k_1 E(x_t) \quad , \text{ Where } k_0 = \frac{\alpha_0}{1-\alpha_1} \text{ and } k_1 = \frac{\beta_0 + \beta_1}{1-\alpha_1}$$

k_1 is the long run multiplier of Y with respect to X .

Now subtract Y_{t-1} from both sides of equation 1 then add and subtract $\beta_0 X_{t-1}$ on the right-hand side to get

$$\Delta Y_t = \alpha_0 + (\alpha_1 - 1)Y_{t-1} + \beta_0 \Delta X_t + (\beta_0 + \beta_1)X_{t-1} + e_t \dots \dots \dots (4.7)$$

Noting that structural specification gives the same model as that of the ad hoc specification of Nerlove's supply function but aiming at avoiding the other problem of the Nerlove's supply model the study uses the following model. The inclusion of variables, therefore, is based on the objective of the study. Therefore, the model is specified as follows.

In order the estimators be Best Linear Unbiased Estimator (BLUE) Classical Linear Regression Method needs to satisfy a number of assumptions, among which non-stationarity of the error term is one. However, as discussed in William E.G.(1993), in such data (time-series data) the assumption that the error terms from successive observations are uncorrelated is frequently invalid; that is investigation will find the residuals to be autocorrelated.

Non-stationarity of data is implied if the data has no constant mean and constant variance, and if the covariance between two observations depends on the number of lead or lags between them.

Stationarity test can be made using graphs or algebra. As described by Mukherjee and et.al.(1998), the ordering of time series can matter since it contains the history of the variables. That is, the value of the variable in one period is an important factor in determining the variable's value in the following period. This facet of time

series may be expressed in a number of time series models, the simplest of which is autoregressive model with a single lag called AR(1).

$$x_t = \beta_1 + \beta_2 x_{t-1} + e$$

If $\beta_2 = 0$, it implies the series has no memory. But if $\beta_2 = 1$, is a case of random walk. This means the value of the variable in one period equals the value in the preceding period plus a deviation by a random error. Many economic time series have the characteristics of a random walk (William E.G. and et.al.,1993). The authors further explained, referring Granger and Newbold, that the out come of regressing one non-stationary variable on the other are, the usual t-tests of statistical significance can be very misleading because they reject the null hypothesis of “no relationship” much too frequently and, thus accept as significant relationships that are spurious far too often.

Granger and Newbold in William E.G. and et.al.,1993, suggested the relationship should be estimated in first differences of the variables than the levels. However, if we wish to study the longrun relationship between variables then it is important to consider their levels rather than difference (William E.G. and et.al.,1993). In this case we are required to test for cointegration. If two time series Y_t and X_t are say $I(1)$ then, in general, the linear combination of $Y_t - \alpha - \beta X_t = \varepsilon_t$ is also $I(1)$. However, it is possible that ε_t is stationary, or $I(0)$. In order for this to happen the “trends” in Y_t and X_t must be cancelled out when $\varepsilon_t = Y_t - \alpha - \beta X_t$ is formed. In this case Y_t and X_t are said to be cointegrated, and β is called cointegrating parameter (William E.G. and et.al.,1993).

4.1 The model

If the variables considered in this study are integrated of order 1 the cointegration for agricultural product export performance (X_o) with price of import, price of export, official exchange rate, and exchange rate premium is (all variables are in logarithm form)

$$x_{ot} = \alpha_o + \alpha_1 P_{xt} + \alpha_2 E_{ot} + \alpha_3 E_{mt} + \alpha_4 Yg + Z_t \dots (4.8)$$

Then the Dicky-fuller test for cointegration is used. That is

$$\Delta Z_t = \sigma Z_{t-1} + U_t$$

$$v_t \cong NID(0, \sigma^2)$$

$$H_0: \sigma = 0$$

$$H_1: \sigma \neq 0$$

If H_0 is rejected in favor of H_1 and σ is negative the conclusion is that the variables are cointegrated implying that the variables have long run relationship.

Recently most time-series economic analyses are formulated in VAR. this is because it is believed that there is a feedback relationship between variables. However, in this analysis, as it is a case in some others too, the model is specified in a single equation. This is because in the Ethiopian context the variables at the left hand side-export performance- cannot affect the right hand side variables for so many reasons explained below.

- The feature of the economy:- both price of import and export are determined by the world demand and supply of goods, which the country has insignificant share. Meaning these variables are determined out of the control (at least for the time being) the economy. Hence, they are exogenous to the model as they are to the economy.

Excess capacity is the ratio of potential to lagged actual output. This variable shows the inefficiency of the economy to use the existing capacity. However, export earning is capacity augmenting

- Policy determined variables:- exchange rate has been a policy determined variable for so long period. The current managed floating exchange rate system, though it is a means of paving the ground for free determination of

this variable, it is still not determined by market forces. In such case the export performance of the country have little role in its determination.

The forgoing discussion shows that the variables at the right hand side are exogenous to the model hence no feedback relationship between the dependent and the independent variables. Therefore, the model is specified as a single equation.

This view is further strengthened by the causality test. Broadly speaking a variable Y_{t1} is said to be Granger caused by Y_{t2} if current and past information on Y_{t2} help to improve the forecasts of Y_{t1} (Gregory C.Chow, 1983).

There are a number of statistical tests of causality (for example, Engle-Granger, and Sims test). The Sims test has the same intuition and interpretation as the Granger test (Mukherjee C. and et.al, 1998).

Therefore, to determine the direction of causation Granger causality test is chosen. Granger causality test involves regressing a variable B on lagged values of itself and another variable A (Granger, 1969). The model proposed by Granger (1969) (in Abdulahi and Reider, 1995) is

$$B_t = \sum_{t=1}^n \alpha_i B_{i-1} + \sum_{t=1}^n \beta_i A_{i-1} + u_t$$

(Unrestricted equation)

$$B_t = \sum_{t=1}^n \alpha_i B_{i-1} + u_t$$

(Restricted equation)

And using the F-statistic obtained by;

$$F = (n - k)(ESS_R - ESS_{UR})/q(ESS_{UR})$$

H_0 : A causes B

H_1 : A do not cause B

Where ESS_R and ESS_{UR} are the sum of squared residuals in the restricted and unrestricted regressions respectively. And n is the number of observations, K is the

number of parameters estimated in the unrestricted regression, and q is the number of parameters estimated in the restricted regression.

If the calculated value of F is greater than the critical F value (from the table) we fail to reject the null hypothesis.

Failing to reject the null hypothesis, A causes B , the rejection of A does not cause B , and the acceptance of B does not cause A is required (Pindyck and Rubinfeld, 1991) in Abdulahi and Reider, (1995). Hence the same procedure is undertaken by transposing the role of the variables A and B .

After testing the causal relationship of variables the error correction model of the agricultural export performance is specified as

$$\Delta X/GDP = \alpha_0 + \alpha_1 \Delta P_x + \alpha_2 \Delta E_o + \alpha_3 \Delta E_m + \alpha_4 \Delta Yg - \gamma R + U_t, \dots (4.9)$$

Where $R = x_{o-1} - P_{nt} - P_{xt} - E_{ot} - E_{mt} - Yg$

P_x is price index of export

E_o is official exchange rate

E_m is exchange rate premium

Yg is excess capacity

All variables are in logarithms and Δ denotes changes.

4.2 The variables and their expected signs:

Export performance: this variable is measured by the shares of exports of agricultural products to gross domestic product (GDP)- both variables are measured in units of local currency.

Price of exports: general export price index (1975 =100) of Ethiopian export is taken as export price index of agricultural exports since at least 73.8⁴ percent of the country's export is agriculture (EEA, 2003/2004). An increase in the price of exports, keeping other things the same, will make the products of exportable goods profitable. This will induce producers to increase their labour supply and use of other inputs on production of exportable. Hence, output of exportable goods will increase. Therefore, the expected sign of the coefficient of price of exports is positive, assuming that part of the gains from the export price rise reaches the producers, output of exportable goods will increase.

Since we assume a small open economy where the price of exports is invariant to the supply of exports of such economy the Cobweb phenomena will not happen.

Excess capacity: this too is unobservable explanatory variable. The variable excess capacity is proxied by defining it as potential output relative to the lagged value of actual output following Knight and Knight (1981) as described in Zelealem, (1997).

$$Y_g = Y_c/Y_{-1}$$

Where Y_c = capacity or potential output

Y_g = excess capacity.

Y_{-1} = actual output in the previous period.

$$Y_c = Y_o e^{gt}$$

Y_o = initial output

g = the rate of growth of output over the sample period

t = time

⁴ The smallest share so far reported.

To find the average rate of output growth over the sample period the study uses the following log model.

$$Y_t = Y_0 (1+r)^t$$

Taking the natural logarithm of the above gives us

$$\ln Y_t = \ln Y_0 + t \ln(1+r)$$

The natural logarithm of output at time t, $\ln Y_t$, is the sum of two components- $\ln Y_0$ and $t \ln(1+r)$. Taking the antilog of $\ln Y_0$ gives the value of output at initial period (at $t=0$). And taking the antilog of $\ln(1+r)$ gives the average growth rate, r, plus one. Therefore, the average growth rate can be found by subtracting one from the antilog of the coefficient of time.

$$\ln Y_t = \ln Y_0 + t \ln(1+r)$$

$$\text{Let } \ln Y_0 = \beta_0$$

$$\ln (1+r) = \beta_1$$

$$\text{Then, } \ln Y_t = \beta_0 + \beta_1 t + u$$

Therefore average growth rate (r) can be found as;

$$r = \text{antilog}(\beta_1) - 1.$$

Apart from the resource reallocation, which is assumed to take place existing capacity is being utilized, in favour of products whose relative price has increased, existence of unemployed resource would favour higher production. The value of this variable is greater than one. As the value approaches one it implies that the economy is becoming efficient in utilizing its resource. And higher excess capacity indicates that there are capacities that are not utilized. Therefore, the expected sign for excess capacity is negative.

Exchange rate premium: this variable is measured by the percentage difference of the parallel exchange rate from the official exchange rate. (i.e. $(E_p/E_o - 1) 100\%$). Decline in exchange rate premium due to exchange rate depreciation⁵ would encourage exports via the official market. Partially the incentive to smuggle will reduce as the exchange rate premium reduces. Hence, the expected sign of the

⁵ Of course exchange rate premium can also be affected due to some other reasons that includes change in export tax, supply of foreign currency to importers.

coefficient of this variable is negative. Meaning an increase in the premium reduces agricultural exports via official channel

Official exchange rate: neoclassical theory suggests that getting prices right that has been depressed by overvaluation of the local currency will favour the production of that good-agricultural output. The increase in profit due to rise in price (in local currency) attracts more resources to the production of agricultural exportable. However, structuralists argue that increase in output will be insignificant. The reason for the non-responsiveness of agricultural exports to price rise, as structuralist explain, are the presence of structural rigidities, such as low infrastructure and incomplete market, that indicates the absence of the neoclassical's assumptions in LDCs to arrive at their conclusion. Therefore, the sign of this variable is going to be tested empirically.

Chapter 5

Estimation result and discussion

5.1 Long run equilibrium model and test results

Test for order of integration

Time series economic data seldom behave as a set of randomly selected data without any connection between successive observations. Indeed, they reflect the underlying history of an economy. But if a given data have constant mean around which the data fluctuates (mean reverting behavior), constant variance (finite and time invariant), and the covariance of two observation K distance apart does not depend on the length of K (lag or lead) then the data is said to be stationary. Such kind of data has temporary memory meaning any shock to the data does not stays long period hence the autocorrelation dies out quickly. However, as indicated earlier most economic time-series data are non-stationary. Meaning they have no long run mean that the data fluctuates around, their variance is time dependent and the covariance between two observation is dependent on the lead or lag length between them (for detail discussion see Griffith W. et al., 1993).

Regression analysis using non-stationary data may be spurious-may look good but further test would prove that the result is 'nonsense'. Such variables often go together: may be following a deterministic trend or random walk. The fact that many socio-economic variables seem to move together should not lead us to infer that such variables are necessarily causally linked. Therefore, before undertaking econometric analysis it is essential to identify the order of integration, i.e. how many times the variable should be differenced before it becomes stationary. In fact many economic time series tend to behave as random walks. Graphical presentation of these data (at level and their difference for comparison) looks that the variables under consideration are non-stationary at level but stationary at first difference (look appendix 1).

ADF Test and Test Result

Among many types of test for unit root ADF is the most popular. The ADF is the extension of DF. The DF test is to test whether the value of a variable at time t , Y_t , is the sum of its value at time $t-1$, Y_{t-1} , and the random term. If it is so it is a random walk (has unit root), or non-stationary, mathematically this can be written as

$$Y_t = \rho Y_{t-1} + \varepsilon_t$$

Or
$$\Delta Y_t = \alpha Y_{t-1} + \varepsilon_t$$

The null hypothesis is that Y_t is not stationary (i.e., $\rho = 1$ or $\alpha = 0$). This test can also add constant, and trend parameters at the right hand side of the equation however; the null hypothesis remains the same.

In ADF further lag values of the variables are included. This augmentation helps to have 'white noise' residuals. Therefore the following table is the result of ADF tests of the variables at level, and at first difference.

Table 5.1 The ADF test statistics for the variables

| Variable | Without constant and trend | | With constant only | | With constant and trend | |
|-----------------------|----------------------------|------------|--------------------|------------|-------------------------|------------|
| | level | difference | level | difference | level | difference |
| Em | -1.193 | -3.43** | -1.672 | -4.506** | -1.897 | -4.444** |
| LEo | 0.9346 | -2.451* | -0.3325 | -3.271* | -2.025 | -3.684* |
| LPx | 0.3762 | -3.017** | -1.223 | -3.819** | -1.834 | -3.752* |
| LX/GDP | 0.01007 | -2.902** | -1.633 | -4.716** | -1.426 | -4.733** |
| LYg | 0.542 | -4.349** | -1.657 | -5.608** | -3.309 | 5.489** |
| Critical values at 5% | -1.955 | -1.955 | -2.975 | -2.975 | -3.587 | -3.587 |
| at 1% | -2.656 | -2.656 | -3.696 | -3.696 | -4.338 | -4.338 |

The ADF test statistics (Without constant and trend, with constant only, with constant and trend) results above fail to reject the null hypothesis, i.e., the

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The ADF test statistics (Without constant and trend, with constant only, with constant and trend) results above fail to reject the null hypothesis, i.e., the

variables are $I(0)$ at level, both at 5% and at 1% significance level. This is so because the calculated t-value of each variable are less than the critical values at the stated significance level, implying $\rho = 1$ or $\alpha = 0$. Therefore, the variables (at level) have unit root. When they are differenced and compare the resulting t value with the critical values indicated at the bottom of the table we reject that they are not stationary at difference. Therefore, all the variables are integrated of order one meaning they have to be differenced once before they become stationary.

Test for co integration

If one performs regression using variables that are non-stationary it may lead to spurious-result the variables 'seems' to have long run relationship while actually they do not. Therefore, test must be undertaken whether the variables of interest have long run equilibrium relationship, in other words whether they are co integrated. Variables are co integrated if the linear combination of integrated order b , i.e. $I(b)$, has residual the integration order of it is less than b . In order for this to happen the "trends" in the variables must cancel out when the linear combination is formed (Griffith E. W., 1993). Since the variables are $I(1)$, in this analysis, the residual need to be stationary to fail to reject the null hypothesis that the variables are co integrated. If the variables are co integrated, meaning they have long-run equilibrium relationship, and there can be an error correction mechanism, which has both the short run and long run adjustments of the variables.

As explained above regression of non-stationary data may lead to spurious result. Moreover, differencing these variables to make them stationary leads to loss of information, hence such spurious relationship collapse when the model is estimated in difference (Mukherjee c. et.al 1998). Test to find the danger of spurious regression when using time data can be made using basically two approaches: system based and residual based approach.

As Gregory W. and Haug A. (1998) discussed, tests for cointegration commonly used are of two types: single equation (residual based tests) and system based testes (invoking the likelihood ratio). Perhaps because no test dominates in finite sample simulation (see for example, Gregory, 1994 and Haug, 1996), many applied researchers report both types of tests. In this study we present the EG residual based approach, the Cointegration Regression Durbin-Watson test and the Johansen system based approach.

A) EG test of cointegration

The Engle Granger test of cointegration follows two procedures. First the residual is taken from the long run equilibrium model estimation. Then the residual is tested for unit root. As a result the test is two-step procedure

Taking the residual of the long run model, the cointegration test is performed as follows.

$$\Delta\check{U}_t = \sigma \check{U}_{t-1} + U_t$$

The null hypothesis is $H_0: \sigma = 0$

The alternative hypothesis $H_A: \sigma < 0$

Where $\Delta\check{U}_t$ is the estimated residual value from the long run model

\check{U}_{t-1} is the lag value of the estimated residuals

U_t is the error term

Augmenting the above equation of the residual with lags is ADF test. Using the above unit root test for the residual the null hypothesis is rejected in favor of no unit root that implies the variables are cointegrated (the result of the test is presented in table 5.2).

Table 5.2 EG test result of cointegration

Null hypothesis: Res. has unit root (no cointegration)

| | | t-statistic |
|--------------------|-----------|-----------------|
| ADF test statistic | | -4.9155* |
| Critical values at | 1 % level | -3.6793 |
| | 5% level | -2.9678 |
| | 10% level | -2.6230 |

From the table above the ADF t-statistics is greater than the critical values at the significance level indicated. Thus we reject the null hypothesis of unit root. Implying that the variables are cointegrated.

B) The Cointegration Regression Durbin-Watson Test

An alternative, and quicker, method of finding out whether the variables are cointegrated is the Cointegrating Regression Durbin-Watson (CRDW) test (Gujarati, 1995). In this test the Durbin-Watson d value obtained from the cointegrating regression is compared with the critical values (provided by Sargan and Bhargava) of 0.511, 0.3861, and 0.322 at 1%, 5%, and 10%, respectively. The null hypothesis is that $d=0$ rather than $d=2$. Since the cointegrating regression result the Durbin-Watson d statistics ($DW = 2.17$) is greater than the critical value even at 1% we reject the null hypothesis of zero Durbin-Watson value. The result suggest the same conclusion as that of the EG two-step procedure test, which is there is long run equilibrium relationship between the variables considered.

C) The Johansen System Based Approach

This approach, unlike that of single equation approach, does not impose structural relationship and or the exogeneity of some of the variables. All variables in the model are potentially endogenous. Therefore there could be $n-1$ cointegrating vectors. The numbers of cointegrating vectors are determined with the help of two statistics: the trace statistics and the maximum eigenvalue.

The superiority of Johansen approach is it gives information that helps not only to determine whether the variables are cointegrated but also to know the number of

cointegrating vectors, which the EG and CRDW tests imposes that it is one (if there exists). In a regression analysis, however, where there are n numbers of variables there could be n-1 cointegrating vectors. Meaning there could be feedback relationship between variables, hence many cointegrating vectors. Therefore, how many cointegrating vectors are present in a multivariate equation is a question that needs careful investigation. To do this we use the Johansen approach. The cointegration analysis made using Eviews 5 is presented below.

Table 5.3 Cointegration analysis of export performance

| | | | | | |
|----------------------|-----------|------------|------------|------------|------------|
| Eigen values | 0.843192 | 0.620528 | 0.333948 | 0.261088 | 0.007182 |
| Null hypothesis | $r=0$ | $r \leq 1$ | $r \leq 2$ | $r \leq 3$ | $r \leq 4$ |
| Lambda trace | 99.06067* | 47.18413 | 20.05283 | 8.673968 | 0.201819 |
| 0.05% critical value | 69.81889 | 47.85613 | 29.79707 | 15.49471 | 3.841466 |
| Prob** | 0.0001 | 0.0577 | 0.4193 | 0.3964 | 0.6533 |
| Lambda max | 51.87653* | 27.13130 | 11.37887 | 8.472149 | 0.201819 |
| 0.05% critical value | 33.87687 | 27.58434 | 21.13162 | 14.26460 | 3.841466 |
| Prob** | 0.0001 | 0.0570 | 0.6095 | 0.3327 | 0.6533 |

Note the statistics lambda max and lambda trace are Johansen's maximal eigen value and trace eigen value for testing cointegration

* denotes rejection of the null hypothesis at 0.05% level

** Mackinnon-Haug-Michelis (1999) p-values.

From the result above the trace statistics λ_{trace} and the max-eigenvalue statistics λ_{max} are greater than the critical values at 5% significance level when the null hypothesis $r=0$ (r is rank) against the alternative hypothesis $r=1$. This helps us to reject the null hypothesis implying that there is at least one cointegrating vector. As we follow this argument, i.e. the null hypothesis is $r=1$ against the alternative $r=2$, we fail to reject the null hypothesis since both λ_{trace} and λ_{max} are less than the critical values (independently). Therefore, the result indicates the variables are cointegrated and the cointegrating vector is single.

Test for structural stability of parameters

When we run regression with sample data we assume that the data are sampled from the same population to which the population regression applied. But if our sample lumps together data that do not really belong together the estimated parameters will not be constant. Hence, the estimated model will be basically useless for forecasting and analyzing economic policy (Hendry, 1995). It is useful, therefore, to test for parameter instability across different samples before we decide to pool them. Here we use the Chow's stability test. This test can be done with the help of linear restrictions. The test is presented as follows.

Regress the long run relationship of the variables using observation of the entire sample. RSS_r denotes the residual sum of squares obtained from this restricted model. And we run using the sample period before the reform and after the reform separately and the residual sum of squares are denoted by RSS_1 and RSS_2 , respectively. The RSS of regression results of these restricted and unrestricted (which is the sum of the later two, before and after the reform period, regressions) are presented in the appendix part (appendix 2).

Running the regression using the entire sample means we pool the data assuming an identical intercept and slope for the two sets of observations. More formally this can be stated as the null hypothesis:

$$H_0: \alpha_1 = \gamma_1 \quad \alpha_2 = \gamma_2$$

Where the alternative hypothesis entails that at least one of these equation does not hold.

α_1 & γ_1 are the intercept of the restricted model and unrestricted model, respectively. And α_2 & γ_2 are the slopes of the restricted and unrestricted model, respectively.

The null hypothesis can be tested by the application of F-test. Here we are examining whether the residual sum of squares is increased due to the restriction-regression using the entire sample as one. The Chow's test result is presented below.

$$F(m, n - ku) = \frac{(RSSr - RSSu) * (n - ku)}{RSSu * m}$$

Where m is the number of parameters including the constant term.

n is the number of observation

ku is the sum of parameters in the unrestricted models.

$$RSSu = RSS1 + RSS2$$

Hence, RSSu = 1.975316. consequently, the F-statistics may be calculated as:

$$\begin{aligned} F(6, 18) &= (3.088669 - 1.975316) * 18 / (1.975316 * 6) \\ &= 1.690899 \end{aligned}$$

From the result of the F value presented in appendix 2, since the calculated value is less than the critical value, we fail to reject the null hypothesis at 5% level. Meaning the RSS has not increased significantly by regressing the entire sample as one. And the slopes and the intercepts are the same hence, assuming the data generating process is similar over the whole period is acceptable.

Test for Granger causality

In Gaussian, standard, or classical linear regression model we have a number of assumption that a model required to fulfill in order the estimators be BLUE (for detail see Gujarati (1995). If a model fails to fulfill (using different tests) those assumptions that OLS estimators may not retain its best, linear and unbiased estimator property. Among these assumption values taken by the regressors are fixed in a repeated sample is one. In a time series analysis this can be explained as;

Given an economic model

$$Y_t = \alpha_0 + \gamma X_t + \alpha_1 Y_{t-1} + u_t \dots \dots \dots (a)$$

and the data generating process of X_t is described by

$$X_t = \xi X_{t-1} + \varepsilon_t$$

If U_t and ε_t are not correlated, we can state that $E(U_t \varepsilon_s) = 0$ for all t and s, and then it is possible to treat X_t as if it were fixed for the purpose of estimating the above economic model of equation (a). That is the independent variable X_t is

independent of the error term, $E(X_t, U_t)=0$, and we can treat it as (strongly) exogenous in the model (Harris 1995). This CLRM assumption can be tested using Granger Causality test as presented below.

Given variables X and Y the test

$$X = \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{j=1}^n \beta_j X_{t-j} + u_{1t} \dots\dots\dots(a)$$

$$Y = \sum_{i=1}^m \lambda_i X_{t-i} + \sum_{j=1}^m \delta_j Y_{t-j} + u_{2t} \dots\dots\dots(b)$$

U_{1t} and U_{2t} are uncorrelated.

We regress X_t on lag value of its area and Y_t and take the residual sum of squares. Then again we regress X_t on the lag value of itself only and take the residual sum of squares. If the variable Y belongs to the model, meaning Y granger cause X, the residual sum of square of the later regression (regression where Y is not included) will increase significant. This can be tested using the usual F test. If the calculated F-value is greater than the critical F value at the given degree of freedom, we say that the RSS of the restricted model is significantly greater than the unrestricted model. Hence the variable excluded in the restricted model belongs to the model. The result of this test for the variables of the model is presented table 5.3.

Table 5.3- result of granger causality test

| Variable | DLXt/GDP | DLEo | DEm | DLPx | DLYg |
|----------|----------|------------|----------|-----------|------------|
| DLXt/GDP | | (81.077)** | (96.8)** | (88.8)*** | (64.087)** |
| DLEo | (0.561) | | (1.23) | (0.034) | (0.0451) |
| DEm | (6.108) | (33.3)** | | (5.999) | (5.644) |
| DLPx | (4.883) | (3.802) | (0.0557) | | (5.235) |
| DLYg | (6.254) | (3.235) | (4.561) | (2.332) | |

Note; ***, **, and * indicates the significance of the calculated F value 1%, 5%, and 10% respectively.

From the above result we can see that the direction of causation between the dependent and the independent variables is unidirectional, i.e. the independent variables cause the dependent variable not the converse. Therefore, the explanatory variables are exogenous to the model.

Test for weak exogeneity

In a multivariate analysis estimating a single equation is potentially inefficient (i.e., it does not lead to the smallest variance against alternative approaches) except in the case where all the right hand side variables in the cointegration vector are weakly exogenous. Therefore, we test for weak exogeneity to prove that the estimation is not inefficient. Here we have two approaches as indicated in Harris (1995).

The Wu-Hausman-type orthogonality test approach, explained in Harris (1995) amounts to regressing the right hand side variable of interest at difference, say the difference of exchange rate premium (DEm), on all the lagged first differenced variables in the model and then testing whether the residuals from this equation are significant in the short run ECM. That is if DEm is weakly exogenous then the residuals from the equation determining it will be orthogonal to (i.e., non-correlated with) the short run ECM determining DLX/GDP. However, Urbain (1992) in Harris (1995) points out that orthogonality will be present anyway (on the basis of multivariate normal distribution), and suggests that it would be more appropriate to test whether the error correction term embedded in the short run ECM is significant in the equation determining DEm. If DEm is weakly exogenous then it does not depend on the disequilibrium changes represented by the lagged residual. Therefore, in this study autoregressive distribute lag model is used as a determining equation for some variables (where it is possible) and for the rest orthogonality test is applied.

1) Testing the significance of the error correction term in the equation determining the variable of interest.

$$\begin{array}{rcccc} \text{DEm} = & + 0.247 & - 3.677 \cdot \text{LEo} & + 3.617 \cdot \text{LEo}_1 & - 0.0755 \cdot \text{Rn}_1 \\ & (\text{SE}) & (0.162) & (0.4) & (0.409) & (0.198) \end{array}$$

The t-ratio of the error correction term is not significant. Hence the exchange rate premium is weakly exogenous to the model.

2) WU-Hausman-type orthogonality test.

Testing weak exogeneity of official exchange rate.

$$\begin{aligned} \text{DLX/GDP} = & - 0.03912 - 1.71 \cdot \text{DLEo} + 1.22 \cdot \text{DLPx} + 0.04769 \cdot \text{DLyg} - \\ & \text{(SE)} \quad (0.12) \quad (1.96) \quad (0.268) \quad (0.113) \\ & 0.7146 \cdot \text{DEm} - 0.9263 \cdot \text{res_1} + 0.4674 \cdot \text{rEo} \\ & \quad (0.2) \quad (0.232) \quad (1.82) \end{aligned}$$

Testing weak exogeneity of price index of export.

$$\begin{aligned} \text{DLX/GDP} = & - 0.07298 - 1.222 \cdot \text{DLEo} + 1.507 \cdot \text{DLPx} + 0.03791 \cdot \text{DLyg} \\ & \text{(SE)} \quad (0.0966) \quad (0.967) \quad (1.24) \quad (0.114) \\ & - 0.7002 \cdot \text{DEm} - 0.8953 \cdot \text{res_1} - 0.3037 \cdot \text{rPx} \\ & \quad (0.239) \quad (0.253) \quad (1.3) \end{aligned}$$

Testing weak exogeneity of excess capacity.

$$\begin{aligned} \text{DLX/GDP} = & - 0.04755 - 1.258 \cdot \text{DLEo} + 1.224 \cdot \text{DLPx} - 0.1595 \cdot \text{DLyg} - \\ & \text{(SE)} \quad (0.0986) \quad (0.946) \quad (0.267) \quad (0.783) \\ & 0.7273 \cdot \text{DEm} - 0.9506 \cdot \text{res_1} + 0.2064 \cdot \text{rYg} \\ & \quad (0.237) \quad (0.211) \quad (0.789) \end{aligned}$$

The residuals of respective variables (which we get from regressing first difference of them on all lagged differenced variables of the model) are not significant in the error correction model. Hence, the result of the test suggests that all the right hand side variables are weakly exogenous to the model. This implies that the estimation result is efficient. Thus the above tests suggest that the usual t-ratio and F-test are valid. Therefore, the following test summary is valid for discussion.

Long run model

The result of unique cointegration vector and weak exogeneity of all the right hand side variables thus suggests that it is legitimate to represent the model with single equation. OLS method in such regression is super consistent, meaning the estimated parameters quickly converge to the true values than in stationary variables (Harris, 1995).

The following estimation result is the regression of export performance on exchange rate premium (Em), official Exchange rate (LEo), price index of export (LPx), and excess capacity (LYg) variables. As indicated above all variable are integrated order of one, i.e. I(1).

Table 5.4 the long run equation result

Dependent variable is LX/GDP

| Variable | Coefficient | Standard error | t-value | Probability |
|----------|-------------|----------------|---------|-------------|
| LYg | -0.094643 | 0.1551 | -0.6103 | 0.5472 |
| Em | -0.812057* | 0.1412 | -5.7508 | 0.0000 |
| LPx | 0.989230* | 0.2730 | 3.6242 | 0.0013 |
| LEo | -1.525925* | 0.2810 | -5.4303 | 0.0000 |
| constant | -4.334102* | 1.1603 | -3.7352 | 0.0010 |

* denotes significance of the variable at 5% significance level

$$R^2 = 0.7711 \quad \text{Adj-}R^2 = 0.734559$$

$$F(4,25) = 21.06 [0.000]** \quad \text{DW stat.} = 1.886061$$

$$\text{AR 1-2 test: } F(2,23) = 0.036017 [0.9647]$$

$$\text{ARCH 1-1 test: } F(1,23) = 0.30609 [0.5854]$$

$$\text{Normality test: } \text{Chi}^2(2) = 5.3876 [0.0676]$$

$$\text{hetero test: } F(8,16) = 0.69128 [0.6943]$$

Not enough observations for hetero-X test

$$\text{RESET test: } F(1,24) = 0.40397 [0.5311]$$

$$\text{LX/GDP} = -4.334 - 0.09464*\text{Lyg} - 0.8121*\text{Em} + 0.9892*\text{LPx} - 1.526*\text{LEo}$$

$$(\text{SE}) \quad (1.16) \quad (0.155) \quad (0.141) \quad (0.273) \quad (0.281)$$

Description of the test summary

The goodness of fit as indicated by adjusted R^2 is 0.73, which indicate about 73 percent of the variation in export performance in the long run is explained by the model. The null hypothesis that the coefficients of all variables in the model are jointly zero is rejected by the result of the F-statistics test indicated above. None of the diagnostic tests presented above are significant at the 95% critical level. Significance levels for rejecting the null hypothesis are given in [] brackets. The information of these tests is; no serial autocorrelation (using lag length up to two), no ARCH effect (the test rejects the presence of autoregressive autocorrelation problem), the residual from the model is normally distributed, and the model is

correctly specified. The diagnostic tests, therefore, presented above shows that the overall explanatory power of the model is satisfactory.

Discussion of the result

From the regression above the coefficient of exchange rate premium (E_m), the price index of export (LP_x), and the official exchange rate (LE_o) are significant at 5% level. But excess capacity (LY_g) is not significant.

The result of the coefficient of price index of export, which is 0.989, tells us there is no one-to-one effect of export price index on export performance. Meaning a 100% increase in price index of export will lead to less than a 100% improvement in export performance. This might be because an increase in export price index will multiply the value of export which is the numerator in export performance variable, X_t/GDP , and the denominator (GDP), since it includes the value of export it also increase. Here it should be noted that value of export is a 'gross value' concept (that includes the value of intermediate input including import) while GDP is a 'value added' concept.

The negative and significant coefficient of the exchange rate premium indicates that an increase in this premium by one percent may decrease export performance by 0.81 percent. Or in other words, the decrease in exchange rate premium by one percent may lead to increase in export performance by 0.81 percent. This supports the hypothesis currency depreciation that results in reduction of exchange rate premium have significant impact on export performance. This implies that much of the country's export goods had been flowing illicitly due to the overvaluation of the currency.

The negative sign of the official exchange rate indicates that depreciation (an increase in the value of LE_o) has a negative impact on export performance. This might be due to its impact on the use of complementary input that the country imports (like fertilizer and pesticide). As the price of these input in terms of domestic currency increase the demand will decrease, *ceteris paribus*. Therefore,

the price effect of currency depreciation (which is positive) might be partly or fully offset by reduction in volume of export. Hence, in total there could be reduction in the value of export. On the other hand depreciation may encourage production of import substitute, which increases GDP. Therefore, these two effects, reduction in value of export and increase in value of GDP, reduces their export performance, which is the ratio value of export to value of GDP.

5.3 Error Correction Model of export performance.

The ECM

If variables are cointegrated OLS estimates are consistent. Although the level regression (the cointegrated regression) is consistent it is usual to proceed to estimation of the error correction model (ECM), which contains both the long run and short run relationship between the variables. To do this we define the 'error correction term', R_{t-1} , which is the residual from the level regression. This error correction term together with the differences of exchange rate premium, official exchange rate, price index of export, and capacity gap variables are regressed on the difference of the dependent variable-export performance. The general error correction models, which have lags of the explanatory variables, is;

$$\Delta X / GDP = \alpha_0 + \alpha_1 \sum_{i=0}^{t-1} \Delta Em_{t-i} + \alpha_2 \sum_{i=0}^{t-1} \Delta LEo_{t-i} + \alpha_3 \sum_{i=0}^{t-1} \Delta LPx_{t-i} + \dots(5.2)$$

$$\alpha_4 \sum_{i=0}^{t-1} \Delta LYg_{t-i} + R_{t-i} + \varepsilon_t$$

The above unrestricted error correction models are general. We utilize the Hendry's general to specific modeling strategy to arrive at parsimonious model of the type indicated in equation (5.3). In this (Hendry's general to specific modeling) procedure we use the standard t and F – tests since the variables are stationary as they are difference of I(1). Starting from longer lags of the explanatory variables the models are regressed and variables with insignificant t-ratio are dropped step by step and F- test is performed to justify the case at every step of dropping process.

The model above have passed all the tests namely; the F-statistic reject the null hypothesis that all the explanatory variables are jointly zero, using the White test for heteroscedasticity we do not reject the null hypothesis of homoskedasticity, the White's test (which is based on the auxiliary regression of the squared residuals on all squares and cross products of the original regressors) rejects the presence hetreoscedasticity, ARCH test (test for autoregressive conditional heteroscedasticity) indicates absence of autoregressive conditional heteroscedastic error. Moreover, the Ramsey's RESET test also does not reject the null hypothesis of no misspecification problem of functional form in the estimated equation. Lastly, the normality test indicates that the null hypothesis of normally distributed error term is not rejected.

Table 5.5 the ECM of export performance

Dependent variable D(LX/GDP)

| Variable | Coefficient | Standard error | t-value | Prob. |
|----------|-------------|----------------|---------|--------|
| D(LYg) | 0.0184 | 0.1155 | 0.1591 | 0.8749 |
| D(Em) | -0.6142* | 0.2056 | -2.9877 | 0.0064 |
| D(LPx) | 1.2045* | 0.2727 | 4.4176 | 0.0002 |
| D(LEo) | -1.0314 | 0.8188 | -1.2600 | 0.2199 |
| Res_1 | -0.8880* | 0.2044 | -4.3438 | 0.0002 |

* denotes the significance of the coefficient of the variables at 5% significance level.

$$R^2 = 0.689265 \quad \text{Adj-}R^2 = 0.637476$$

$$\text{DW stat.} = 1.842222 \quad F(5,23) = 10.43 [0.000]**$$

$$\text{AR 1-2 test: } F(2,22) = 0.035334 [0.9653]$$

$$\text{ARCH 1-1 test: } F(1,22) = 0.89532 [0.3543]$$

$$\text{Normality test: } \text{Chi}^2(2) = 5.1375 [0.0766]$$

$$\text{hetero test: } F(10,13) = 1.9603 [0.1273]$$

Not enough observations for hetero-X test

$$\text{RESET test: } F(1,23) = 0.37217 [0.5478]$$

$$\begin{aligned} \text{DLX/GDP} = & + 0.01838*\text{DLyg} - 0.6142*\text{DEm} + 1.205*\text{DLPx} - 1.031*\text{DLEo} \\ & (\text{SE}) \quad (0.116) \quad (0.206) \quad (0.273) \quad (0.819) \\ & - 0.888*\text{Res}_1 \\ & (0.204) \dots\dots\dots(5.3) \end{aligned}$$

Description of the test summary

The model has an adjusted- $R^2 = 0.64$ indicating that 64 percent of the total variation in the dependent variable is explained by the independent variables included in the model. None of the diagnostic tests reported above, save for the F-test that the entire slope coefficient are zero, are significant at the 95 percent of significance level. Therefore, there is nothing to suggest the model is misspecified. These tests cover the goodness of fit of the model (adjusted- R^2) that is good as explained above, the Durbin-Watson test for first order autocorrelation rejects the null hypothesis of autocorrelation problem, a Breusch-Godfrey LM test for serial autocorrelation up to the second lag rejects the presence of serial correlation; an ARCH test for autoregressive conditional Heteroscedasticity, obtained by regressing the squared residuals from the model on their lags (here one lag), also rejects the presence of autoregressive autocorrelation problem, the normality test rejects the null hypothesis that the residual from the model is not distributed normally, the White's test for Heteroscedasticity, involving the auxiliary regression of the squared residuals on all squares and cross products of the original regressors rejects the null hypothesis of heteroscedastic variance of the error term-hence it is homoscedastic, and the Ramsey's RESET general test of misspesification also rejects the null hypothesis of functional specification problem. Therefore, the tests above indicate that the model is satisfactory.

Discussion on the estimated result

The estimated coefficients of differences of exchange rate premium, and price index of export are significant. While the coefficient of exchange rate premium is negative the coefficient of price index of export is positive as expected. These imply in the short run these variables have significant impact effect on export performance. Depreciation of currency that results to reduction of the exchange rate premium will affect the incentive to smuggle hence, export performance improves as part of exportable that has been smuggled switches to the official market. The usual omission of the exchange rate premium variable in the analysis

of export adjustment to currency depreciation becomes clearly unwarranted. The insignificance of the coefficient of exchange rate in the ECM indicates that its production effect in the short run is insignificant. As to the error correction term it has the expected sign and significant at the usual 5 percent level. It tells us what percent of the disequilibrium in export performance in one period is corrected in the next. From the result above about 89% of the discrepancy between the actual and the long run value of export performance is corrected each year.

Comparing the short run elasticity of export performance to exchange rate premium with the long run elasticity we can see that the short run elasticity is lower than the long run, which is the usual case.

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CHAPTER 6

6.1 Summary of Findings and Conclusion

According to studies of the IMF and WB the failure of African economies during the last few decades was mainly attributed to policy failure. The high intervention of these governments in the economy is presumed to distort the price signals hence resource allocation. The implication is that economic growth can be attained by minimizing the government intervention and 'getting price right'. In this effort many countries have undertaken economic reform program. However, the proposition of these big international financial institution have been criticized on the ground that price signals have less role in the allocation of resources in these least developed economies. Rather they argue that the structural rigidities prevalent in these economies have to be alleviated prior or in complement to trying to correct the relative price of agriculture through policy measures like devaluation. Otherwise, they add, this measure can lead to contraction of output. Studies made on the effectiveness of devaluation on increasing agricultural export supply and restoring economic growth in LDCs are many. Few indicating that devaluation is effective and others not. Most of the studies use single commodity supply response to measure the effectiveness of devaluation while few others have methodological problems.

The negative and significant coefficient attached to the exchange rate premium indicates that there was significant illicit export due to the overvaluation of the currency. The claim by some literatures that 'smuggling of export cannot be reduced by reducing exchange rate premium since these exports are the result of capital flight and demand for luxury goods' is proved wrong.

Taking into consideration these problems an ECM is specified. The study has come out with the result that the production response of the agricultural sector to improve the export performance of the country is insignificant. Considering the theory of Shultz 'farmers are efficient but poor' the empirical result induces one to suspect that there are structural rigidities.

Thus the finding can possibly be extended to forecast that export performance will hardly be responsive to price incentives unless it is possible to overcome those rigidities. The structural rigidities can be behavioral or others. If producers (farmers) do not significantly increase their production of good whose relative price has improves despite their capacity and knowledge, then it is due to risk-averse or drudgery-averse behavior. But there are also other non-price factors like low access to land and low access to technology. The latter are termed, in this study, as other structural rigidities.

To improve the role that can be played by price signal in the agricultural sector and since these structural rigidities have public good characteristics where the private investment is lacking the following recommendation are forwarded.

6.2 Recommendation

From the econometric result presented in the earlier chapter as the exchange rate premium erodes export performance improves. This is due to switch of trade from illicit to official channel. This is beneficial to the country since it increases foreign exchange earnings. Though the positive impact of currency depreciation on export performance through its effect on exchange rate premium is recognized, the improvement in export performance by this effect do not sustain because the illicit trade is limited. To reap the potential benefit through reducing the inefficiencies of resource utilization (as shown by the excess capacity variable) is essential. Recalling that improving structural rigidities and 'getting price right' are complementary rather than substitutes export performance requires concerted effort on attacking the structural rigidities that obstructs the smooth functioning of the forces of demand and supply. Some of these non-price factors that are implied by the negative coefficient of the excess capacity variable are presented below. It should be noted that this list is the sum result of both the theoretical discussion, which is established knowledge, and the econometric analysis of this study.

1) Addressing the drudgery-averse behavior.

Money income helps to satisfy, among others, the need for durable and non-durable consumer goods. If these consumer goods are absent or in short supply the incentive to produce more marketable goods will be low. By increasing the supply of these consumer goods it is possible to reduce the value attached for leisure time and induce farmers to increase the supply of their labor time. As a result idle resources (if there are) will be utilized.

2) Addressing the risk-averse behavior.

Risk-averse behavior is normal and it is believed that risk-loving behavior is a positive function of income. Since access to sufficient food with reasonable price (consider also price variability), is unreliable farmers attach higher value hence priority to produce for home consumption. These consumable agricultural products

are cereals, which take vast area. This increases the risk of undertaking other product mix.

Therefore, in this subsistence farming to increase the supply of exportable the farmer need to secure first its food consumption. To secure its food consumption its productivity in cereal production has to be improved. This has many effects. First, more land will be left for the production of marketable and second it will stabilize the price of cereals. This would reduce the risk of shifting resources away from production of cereals and use them in production of cash crops. To improve agricultural productivity and stabilize price of cereals emphasis should be given to production augmenting factors.

3) *Others*

The foregoing discussion is based on farmers (producers) have perfect knowledge about the relative price increase of exportable goods and have the capacity to claim their share. However, given the low infrastructure and large number of producers, the availability of sufficient information and farmers bargaining power to get their share is limited. Hence, effort should be levied on improving the economic and social infrastructures.

Finally, whether devaluation has changed the relative profitability of export should be tested empirically.

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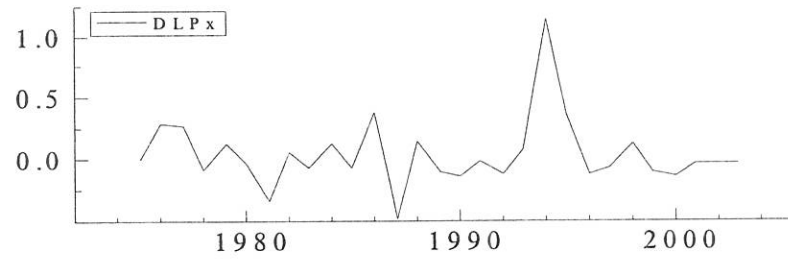
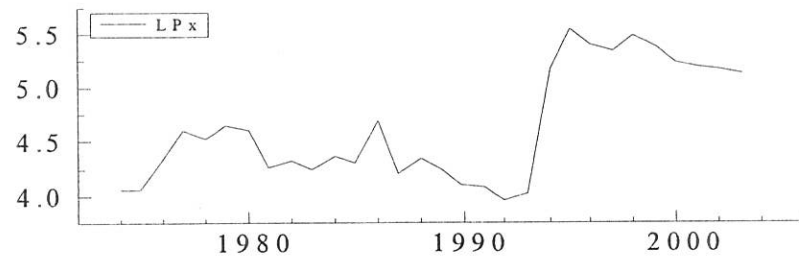
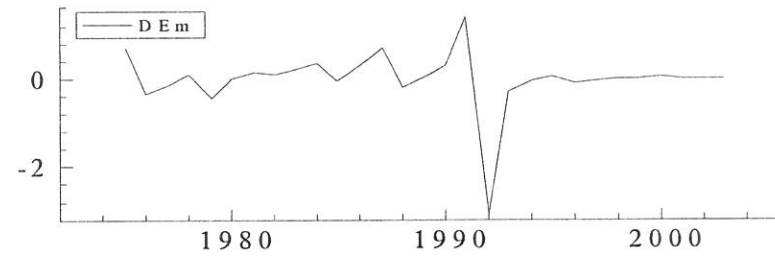
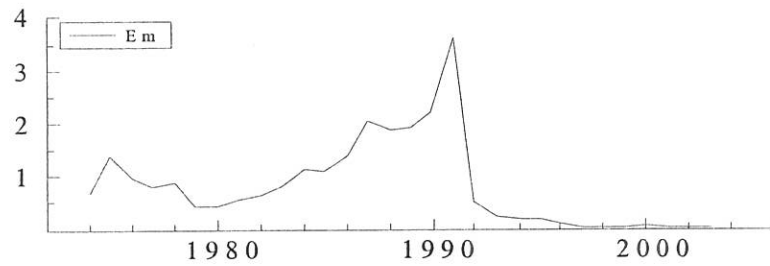
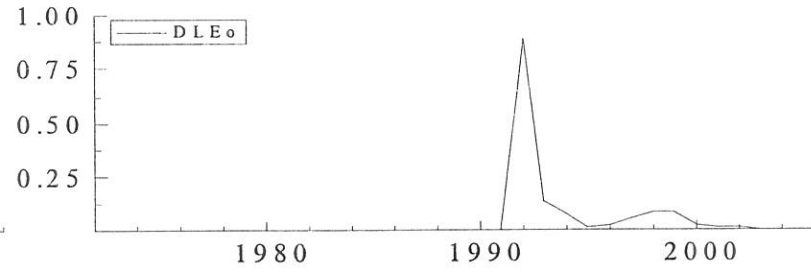
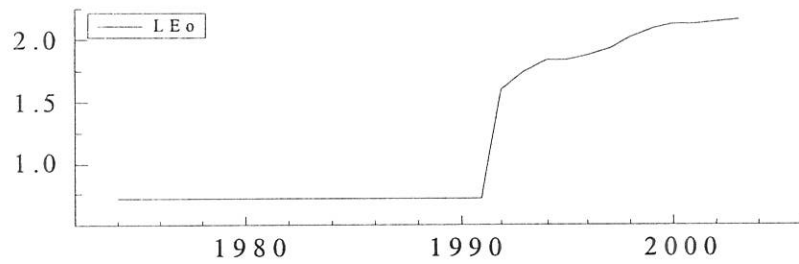
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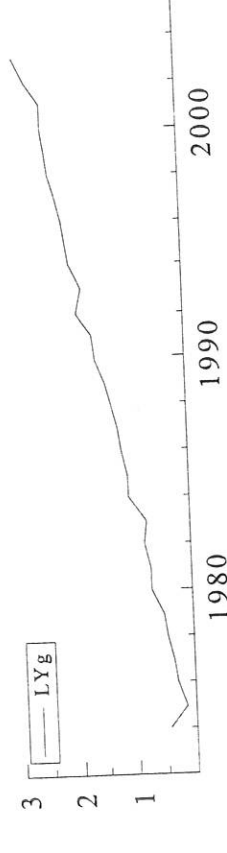
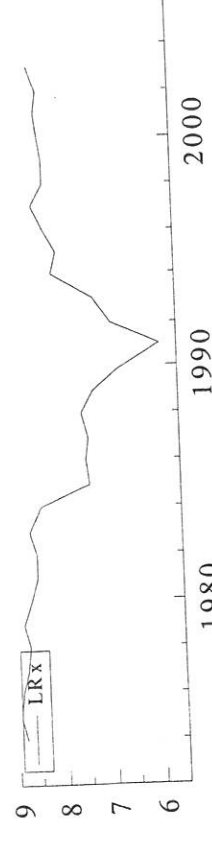
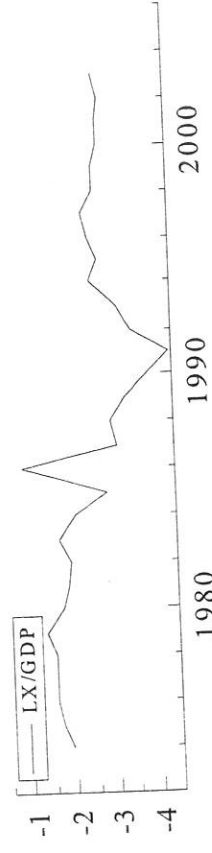
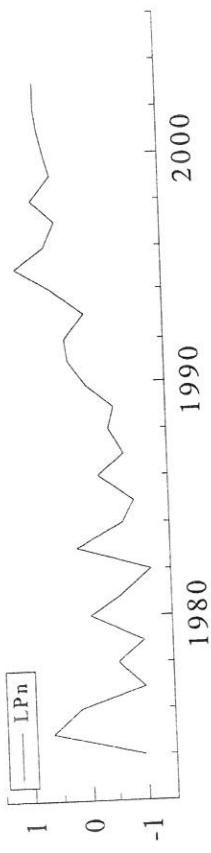
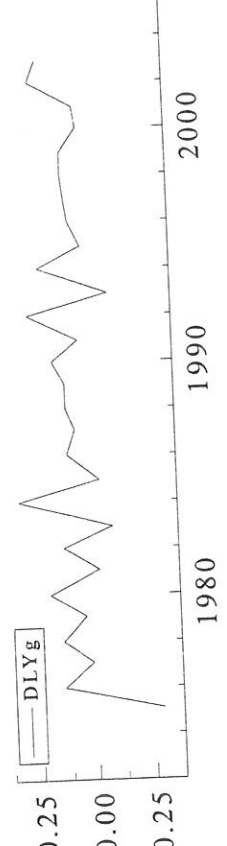
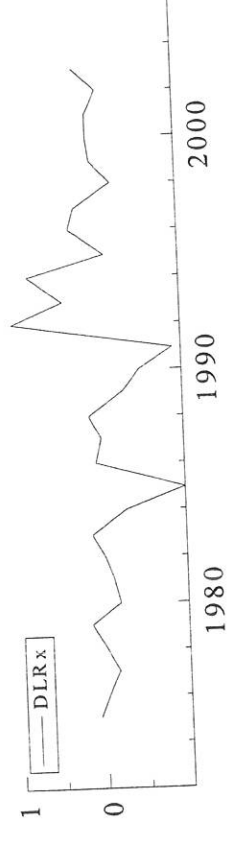
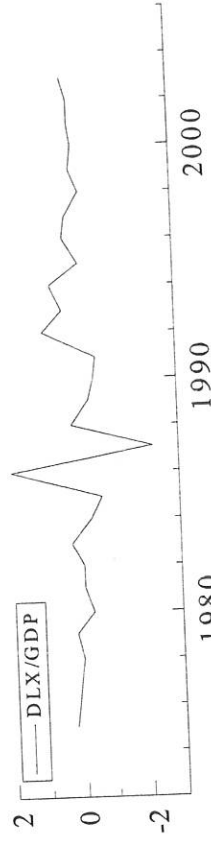
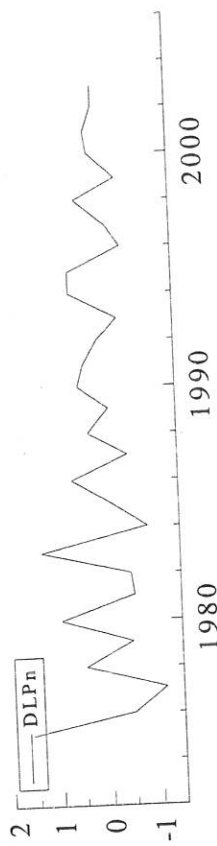
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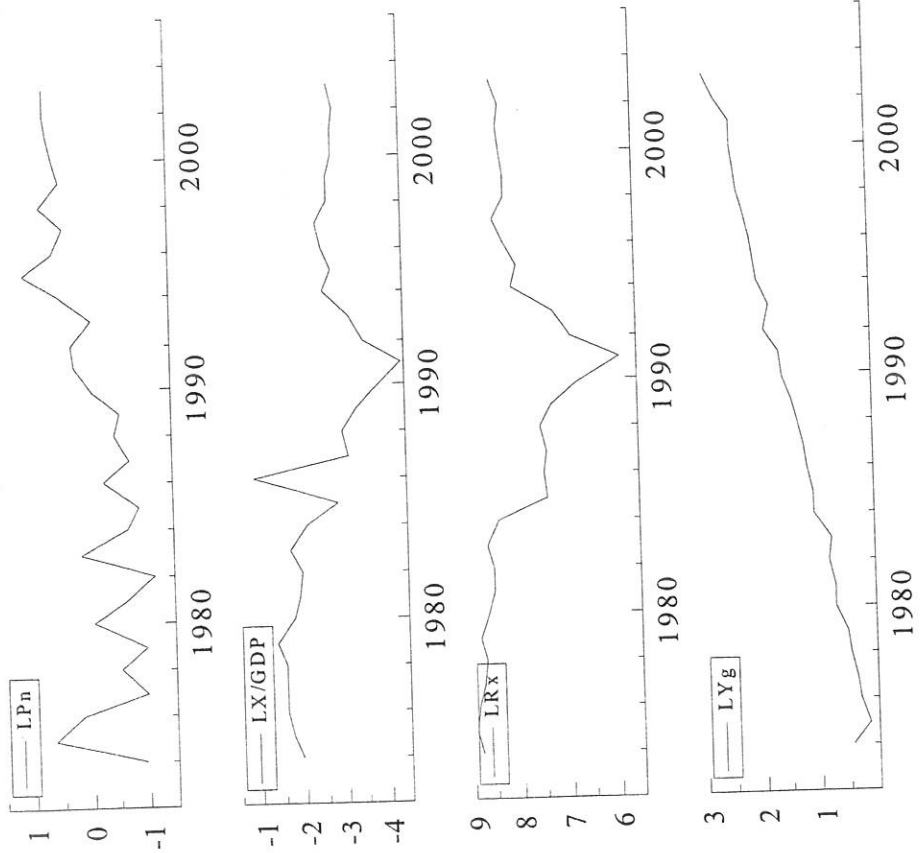
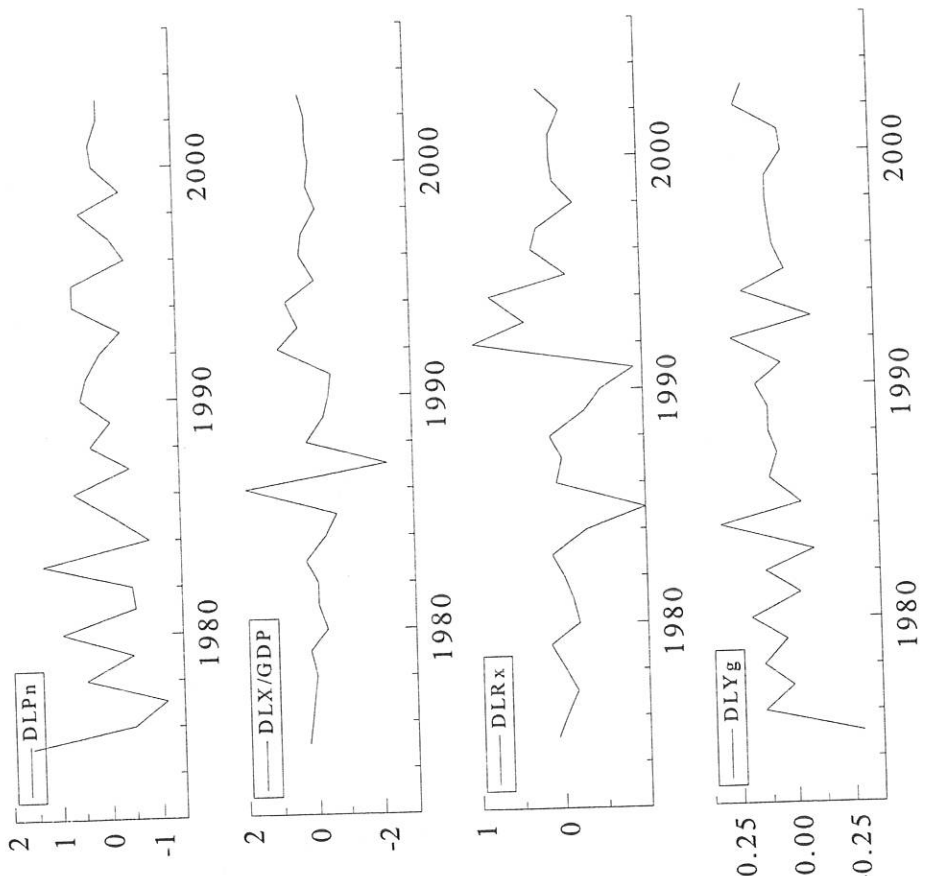
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Annex 1

Graphical presentation of data at level and at difference to see stationarity of them







Annex 2

Chow test

$$F(m, n - ku) = \frac{(RSSr - RSSu) * (n - ku)}{RSSu * m}$$

Where m is the number of parameters including the constant term.

n is the number of observation

ku is the sum of parameters in the unrestricted models.

$$RSSu = RSS1 + RSS2$$

Hence, $RSSu = 1.975316$. consequently, the F-statistics may be calculated as:

$$F(6, 18) = (3.088669 - 1.975316) * 18 / (1.975316 * 6) \\ = 1.690899$$

This calculated value is less than the critical value of 2.77 we fail to reject the null hypothesis at the 5 percent level. The residual sum of squares of the restricted model, i.e. model (1), has not increased due to the restriction. Therefore, the regression equation (1) is justified meaning assuming the slope and intercept coefficients are the same and assuming the data generating process of the whole sample period is similar is acceptable.

Annex 3

Testing for weak exogeneity

Two approaches

1) Testing the significance of the error correction term in the equation determining the variable of interest.

$$DE_m = +0.247 - 3.677 * LEO + 3.617 * LEO_{-1} - 0.0755 * Rn_{-1} \\ (SE) \quad (0.162) \quad (0.4) \quad (0.409) \quad (0.198)$$

2) WU-Hausman-type orthogonality test.

The null hypothesis is that the residual from regressing the variable of interest on the entire lagged first-differenced model is not orthogonal to the ECM. This is found by using the residual as a regressand in the ECM and test for its significance. If it is significant, fail to reject the null hypothesis and implying that the variable of interest is not weakly exogenous to the model.

Testing weak exogeneity of excess capacity.

$$DLX/GDP = -0.1043 - 0.4492*DEm + 1.267*DLPx + 0.1001*DLPn + 0.1611*DLYg - 0.9607*Rn_1 + 0.213*Ryg$$

(SE) (0.0956) (0.114) (0.269) (0.156) (0.838) (0.236) (0.824)

Testing weak exogeneity of price of export.

$$DLX/GDP = -0.1489 - 0.4401*DEm + 2.139*DLPx + 0.1025*DLPn + 0.03162*DLYg - 0.8221*Rn_1 - 0.9381*Rpx$$

(SE) (0.0839) (0.109) (1.21) (0.154) (0.116) (0.257) (1.27)

Testing weak exogeneity of price of import

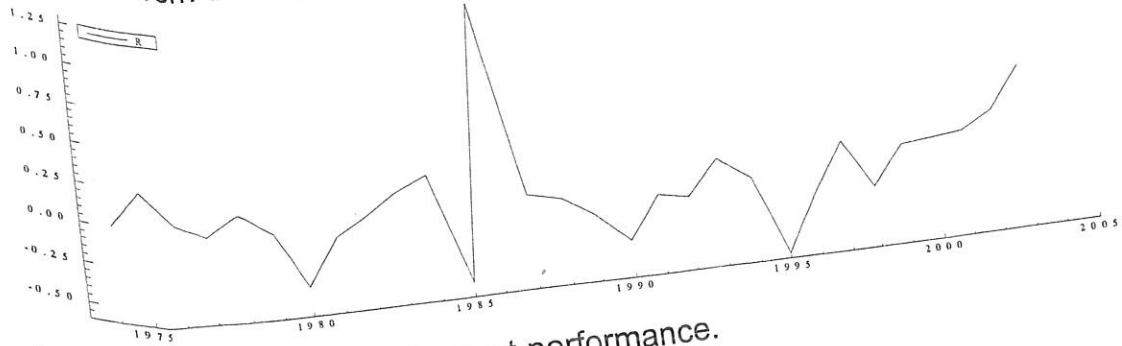
$$DLX/GDP = -0.1376 - 0.4317*DEm + 1.214*DLPx - 0.2122*DLPn + 0.03913*DLYg - 1.069*Rn_1 + 0.3555*Rpn$$

(SE) (0.0855) (0.115) (0.3) (0.632) (0.119) (0.251) (0.679)

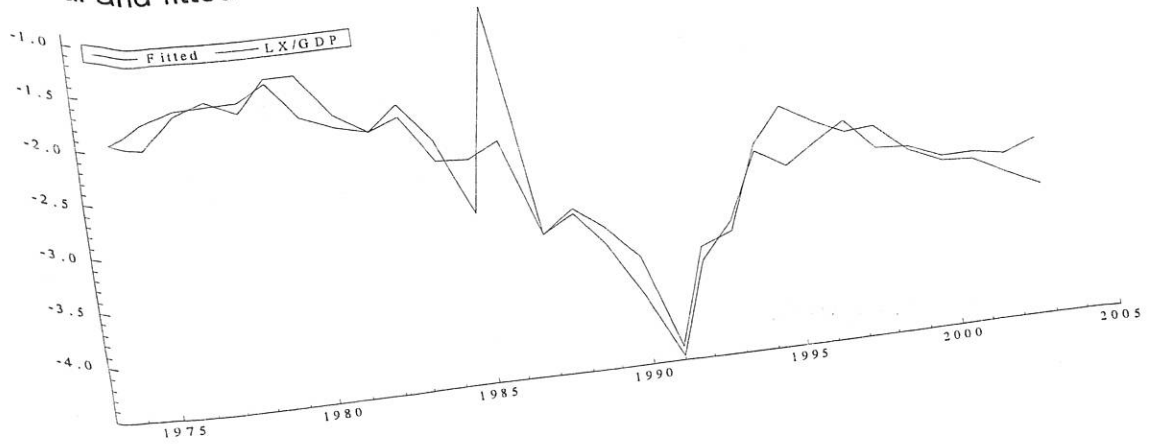
Since in all of the three regression equation the residual introduced is not significant at the usual 5% of significance level, we reject the null hypothesis of the variables at the right hand side of the ECM are not weakly exogenous.

Annex 4

Residual from the regression equation of ()




Actual and fitted values of export performance.




Declaration

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

Declared by:

Name: Sisay Gugpa
Signature: 
Date: June 16, 2005

Confirmed by Advisor:

Name: Gebrehiwot Ageba
Signature: 
Date: _____

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