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# Does the Export Competitiveness of Coffee Improving So far?

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## *Abstract*

*The general objective of the study is to examine the export competitiveness and determinants of export performance of the Ethiopian coffee sector. In analyzing competitiveness of the country in its coffee exports, data from UNCTAD-ITC is used for the periods 1991-2016. The Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) measures of competitiveness were used for the analysis. Furthermore, a multiple regression (OLS model) has also been employed to investigate the determinants of coffee export competitiveness and performance as well. Results for the RCA and RSCA showed that Ethiopia has comparative advantage in exports of coffee.*

*The regression analysis revealed domestic consumption level of coffee affects export competitiveness adversely and this relationship is statistically significant. All other variables including domestic production level, world price of coffee, exchange rate and export volume were found to affect export competitiveness positively and the effect is significant. Though domestic producer price affects the export performance of the sector positively, the effect is statistically insignificant. The government of Ethiopia should put measures in place to address current inefficiencies on the supply side, most importantly management of price risk, resulting from the volatile nature of coffee prices, both domestic and international and the gap between the time of purchase of beans from buyers and the sale to exporters, quality control, smuggling, illegal dealers and transaction costs.*

**Key Words:** Coffee, Competitiveness, Export, Ethiopia, RCA, RSCA

**JEL Classification:** Q27, N70

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## **1. Introduction**

The idea that the world is increasingly becoming more and more interconnected can be seen today from various perspectives. The process of economic integration, globalization and technological advancement strengthen the export development of nations. Export development plays an important role in promoting economic growth and development. It contributes significantly to enhance capital inflow, reduce trade balance deficits, make balance of payments (BOP) surplus, increase employment and expand the production base of a nation. Export is one of the prominent channels of technology transfer from developed economies to the Least Developed Countries (Pack, 1993). Developing countries can expand their markets by allowing firms to export and achieve economies of scale.

As a result of the increasing size of international trade, the concept of export competitiveness plays a vital role in the international trading system. It has been given attention in order to develop national export portfolios. To promote economic development and indeed survival in the global competitive market, it has become an essential component for a country (Sachitra, 2013). Export competitiveness or export performance generally can be measured by several factors, including a real exchange rate, comparative advantages, terms of trade, geographic concentration, trade policies, domestic production and consumption, world income, and prices. This study will employ Revealed Comparative Advantage (RCA), Revealed Systematic Comparative Advantage (RSCA) and simple linear regression to check the export competitiveness of coffee.

Substantial improvement has been made in importing countries with respect to the reduction or removal of certain tariffs. These efforts have been undertaken both within the multilateral framework created by various rounds of trade negotiations of GATT Agreements including the Tokyo, Uruguay and Doha rounds, and within the framework of regional or bilateral agreements. In addition, Member countries of the European Union have applied a preferential trade system to the African, Caribbean and Pacific States (ACP) since 1975. Some countries do not benefit or benefit only partially from tariff reduction measures applied by the European Union within the framework of these trade cooperation agreements. In the case of these countries, for example, only exports of green coffee are exempt from

tariffs, indicating that the creation of added value must take place within the European Union (Cherkos, 2017).

Coffee is outstanding for being produced in nearly all non-arid countries in the tropics. In many of these countries, foreign exchange earnings from coffee exports are of vigorous significance to the balance of payments and to their overall economies. Coffee is an important element of development, generating cash returns in subsistence economies; moreover, production and harvesting of coffee is labor-intensive, and it provides an important source of rural employment, for both men and women. In terms of international trade, coffee is the most valuable tropical agricultural product. According to Utting-Chamorro (2005) coffee is the “second most traded commodity after petroleum” and it also “determines the livelihoods of 25 million poor families”. Its status as a major export for many countries and a determinant of the wellbeing of many national economies, gives it significant importance in the global economy.

According to the IMF Country Report of 2016, Ethiopia relies heavily on agriculture for its foreign exchange earnings. The major agricultural export crop is coffee, providing approximately 35 percent of Ethiopia's foreign exchange earnings (David B., Christian C., 2013 and Yetsedaw E. 2017). Ethiopia is the original home of coffee Arabica and is well-known for its production of high-quality coffee. The export of this commodity has found well-established and profitable markets; providing huge amounts of foreign currency and enhancing economic development (Yetsedaw, 2014).

There have been significant domestic policy reforms in the last decade that have affected the structure and performance of Ethiopia's coffee export sector, not least the creation of a new and modern commodity exchange. From December 2008, it became mandatory for private traders to sell their coffee through the Ethiopian Commodity Exchange (ECX). Gabre-Madhin and Goggin (2005) argued that a commodity exchange in Ethiopia held the potential to produce a more integrated agricultural market, and the introduction of an exchange has been justified from a bottom-up perspective. Certainly, both farmers and traders have seen a better-organized domestic and regional market, and improved agro-processing. In addition, the commodity exchange has had the potential to produce a more efficient and

integrated agricultural market by providing actors with better information about market prices, quality controls and product standards as well as a legal framework to reduce the risk of default. Equally, of course, the success of a commodity exchange depends critically on the economic order and the linking of institutions such as market information systems, quality certification, regulatory frameworks and legislation, arbitration mechanisms, and producer and trade associations.

Tadesse G. (2015) investigated the major determinants of coffee export supply in Ethiopia for the period of 1981-2011. His study employed a Vector Auto Regressive and Error Correction approach to identify the major determinants. It further used the Granger causality test to find the direction of causality between coffee export supply and some of the independent variables. The findings indicated that the real export price of coffee, domestic production, physical infrastructure, and the world supply of coffee all affected Ethiopian coffee exports significantly. The ratio of export plus import to GDP, a proxy for openness to trade, affected exports only in the long run. The report found that the impact of the real exchange rate in both the long and the short run was statistically insignificant. The Granger causality test established bi-directional causality of coffee exports with domestic production of coffee, but direction of causality of coffee exports with real export price and world production of coffee was uni-directional. The policy implication is that improvement in the quality of coffee exports, expansion in domestic production and in the road sector, could all have a significant effect on the supply of coffee for export.

Hussein M and Nandeeswara R. (2015) attempted to analyze the determinants of Ethiopia's Sidama coffee exports in the international market over fourteen years using the Tobit Random Effect Model. The result of the traditional gravity model showed that most of the exogenous variables demonstrated that Ethiopia's GDP was significant and had a positive effect on the export of Sidama coffee. The coefficients of the exporter country's population and importer country's population had positive and negative impact respectively. However, only the economic size of the exporting nation, difference in per capita income and the resistance factor of distance had a significant effect on the Sidama coffee trade. The structure of Ethiopia's foreign trade has meant a concentration of exports to a limited

number of countries; and Europe accounts for almost all exports including Sidama coffee.

Given that coffee is among the top products prioritized by the Government of Ethiopia as a major source of foreign exchange, we looked at the potential determinants of the export performance of the sector to assess the extent to which it is internationally competitive. In doing so, we employed an econometrics technique and a generally accepted measurement of export competitiveness. We also considered the export performance and export competitiveness of the top export exporting countries. This paper then forwarded some implementable solutions for the observed problems of the export performance. Our approach differs from previous studies on export competitiveness as we have employed both RCA/RSCA and econometrics technique at the same time to explore the extent in which Ethiopian coffee is internationally competitive.

## **2. Coffee as a Global Commodity**

Coffee is remarkable for being produced in almost all non-arid countries in the tropics. Over 50 countries produce coffee in significant amounts; in many of these, earnings from coffee exports are of vital importance to the country's balance of payments. A further characteristic is that, with negligible exceptions, coffee is produced in developing countries, including a significant number of least developed countries (LDCs). Consumption, on the other hand, largely takes place in industrialized countries. Coffee is an important agent of development, providing a livelihood for millions of people around the world; generating cash returns in subsistence economies and, since coffee production and harvesting are labor-intensive, providing an important source of rural employment, for both men and women.

Small-scale producers are more vulnerable to economic swings, so if the price of production dips below the amount they receive for the product, producers look for ways to lower the cost of production. Often this results in "threats to the land and wildlife where coffee is grown" perhaps through selling land to developers or plantations, failing to maintain high production standards, or simply neglecting land when producers seek work elsewhere

(Utting-Chamorro, 2005). Coffee is generally sold through the commodities market where price is determined by supply and demand. As an agricultural product, the supply of coffee is dependent upon many factors including weather, trade relations, and market conditions. A freeze in Brazil can decrease supply, resulting in increased prices almost overnight, while the establishment of new coffee producing regions can cause prices to fall (ICO 2015).

As coffee-producing regions tend to be among the more economically poorer regions of the world, poverty in these areas makes it tempting for struggling producers to cut corners in order to make short-term profits. (ICO 2015). Prolonged periods of low prices strain liquidity at the farm level, resulting in less than optimal input use during the following production cycle, negatively affecting yields and quality. The expectation of future coffee prices too low to cover full costs of production can hamper important investments in renovation of coffee plantations. Replanting is particularly important as part of the mitigation of the impact of climate change and to respond to increased pest and disease pressure. Low or negative profitability may also lead to the abandonment of coffee production as farmers may switch to other more profitable agricultural crops. There is widespread concern in the coffee sector that a prolonged phase of low coffee prices could negatively affect the supply of high-quality coffee beans and have adverse effects on household incomes in coffee growing communities. Specific policies need to be formed to address the issues of economic sustainability of coffee production, stabilizing supply in the future and enabling farmers to be fairly remunerated.

Because the health of the coffee market makes a significant difference to small-scale farmers, to coffee quality, and to the local environment, there has been an interest on the part of Northern consumers to get involved in the market. One such way has been to develop certification systems to ensure that standards are kept high. Certification systems developed for the coffee industry may have different focuses, but most include some mix of social, environmental, and economic components. In the meantime, consumers have become increasingly educated about coffee, resulting in exponential growth in the specialty coffee market and coffee with certification. Growth in the Eco labeled coffee industry has led to

competition among labelers and the temptation to exaggerate the benefits of a given Eco label to gain a larger market share. ICO (2015).

## **2.1 Ethiopian Coffee Industry**

The story of coffee has its beginning in Ethiopia where Arabica Coffee originated and where it still grows wild in highland forests. In terms of varieties, all coffees from Ethiopia are typical Arabica; as the original homeland, numerous varieties have developed in Ethiopia. Among these is the well-known Gesha variety, indigenous to Ethiopia (but now best known as Panamanian Geisha after it was transported to Panama in the 1930s). The existence of numerous genetically diverse strains of coffee places Ethiopia at the center of origin, and as the center of diversity and dissemination of the plant.

The cultural heritage of coffee consumption has significantly contributed to sustainable production for centuries in Ethiopia. Coffee drinking in Ethiopia involves a unique ceremony that takes an hour or more. The ceremony has great value in human relations and stimulating discourse. During a coffee session different social, political and economic issues are raised, discussed and solved. It is estimated that the per capita consumption of Ethiopia's estimated 110 million people is around 2.3 kg per year, putting the annual domestic consumption at around 240,000 tons (ICO 2014).

Ethiopian coffee production systems are broadly classified into four: forest (8-10%), semi-forest (30-35%), garden (50-55%), and plantation (5-8%). The basis of Ethiopian coffee culture is rooted in organic farming, agro-ecological sustainability and biodiversity. Ethiopian coffee types are identified by their distinct characteristics such as flavor, aroma, and taste. Due to its unique qualities, exported Ethiopian coffee is commonly used when blending coffees of other origins, but Ethiopian coffee types are increasingly found in specialty markets branded in the specific name of producing areas.

Ethiopia is the first country where coffee was sold according to the location in which it was produced. Known coffee types produced and exported from Ethiopia now include Yirgacheffe, Sidamo, Limu, Teppi, Bebeke, Djimma, Lekkempti, Kaffa and Harrar. These are found growing in

the southern, south-western and eastern parts of the country. New coffee types emerging from the northern producing region include Zege and Ayehu. The profiles of coffees coming from individual growing regions have distinctive and inherent qualities. These match well with the interest of customers who chose to buy certain and selected qualities only.

Coffee is the leading export commodity in Ethiopia which is the biggest coffee producer and exporter in Africa and among the world leaders. Ethiopian coffee has been exported to more than 50 countries, but major current destinations are Germany, Saudi Arabia, Japan, Belgium, United States of America and France. In addition to the significance of coffee as a major export commodity, it provides a means of livelihood for millions of people and plays a vital role in their socio economic and cultural values. Since 90% of the coffee in Ethiopia is produced by smallholder farmers, coffee is an important source of income and employment at farm level.

It is produced mainly in 5 regions of the country, that is in 30 zones or 172 Woredas (districts). Of these, 125 Woredas are considered major producers for export. An estimated 700,000 hectares is devoted to coffee production and overall annual production is 480,000 tons a year, of which some 50% is consumed domestically. 25% million people are directly and indirectly engaged in the sector. (MoT Report 2016).

### **3. Research Methodology**

#### **3.1 Data Type, Sources and Method of Analysis**

- a. Data Type:** Data type for this study is basically secondary data collected from different sources. However, we have also informally consulted individuals who are involved/well informed about the export sector. Though their input is not included in the analysis separately, their information has provided benchmarking and cross checking for the result obtained from the formal methods of data analysis employed.
- b. Data Sources:** The main sources used in this study include the International Coffee Organization, International Trade Centre, Ethiopia Revenue and Customs Authority, ECX, Ministry of Trade, National Bank of Ethiopia.
- c. Method of Data Analysis:** After collecting the necessary data for the variables included in the model and the variables used to calculate RCA

from the above-mentioned sources, we employed RCA, RSCA and an econometrics tool to assess the determinants of export performance and export competitiveness of the sector.

#### **A. Revealed Comparative Advantage (RCA)**

The RCA analysis is largely based on contributions of Balassa (1977) and Vollrath (1991). The concept of RCA was introduced by Balassa in 1965 to identify the relative trade performances of countries. In this model, it is assumed that the commodity pattern of trade reflects inter-country differences in relative costs as well as in non-price factors.

The RCA indicates whether a country is in the process of extending the products in which it has a trade potential, as opposed to situations in which the number of products that can be competitively exported is static. A measure of revealed comparative advantage is used to help assess a country's export potential. It can also provide useful information about potential trade prospects with new partners. RCA measures, if estimated at high levels of product disaggregation, can focus attention on other nontraditional products that might be successfully exported.

Revealed Comparative Advantage (RCA) is one of the measures of international competitiveness and has gained general acceptance (Utkulu and Seymen, 2004). It is based on conventional trade theory and measures a country's exports of a commodity relative to that of a set of countries. RCA indices evaluates export performance as the total exports of a specific product, divided by the total exports of that country, compared to the world exports of the product, divided by total world exports. The factors that contribute to movements in RCA are economic: structural change, improved world demand and trade specialization. The RCA index is defined as the ratio of two shares. The numerator is the share of a country's total export quantity of the commodity of interest in its volume of total exports. The denominator is share of world exports quantity of the same commodity in total world exports volume. RCA is defined as follows:

$$RCA_{ij} = (X_{ij}/X_{it}) / (X_{wj}/X_{wt}) \quad (1)$$

Where,  $RCA_{ij}$  represents the RCA of a given country  $i$ ,

$X_{ij}$  represents the export volume of product  $j$  in country  $i$ ,

$X_{it}$  represents the total export volume of country  $i$ ,

$X_{wj}$  represents the export volume of product  $j$  of the world and

$X_{wt}$  represents the total export volume of the world.

$RCA < 1$ : the product has no capacity of competitiveness

$1 < RCA < 2.5$ : the product has a low capacity of competitiveness

$RCA > 2.5$ : the product has a high capacity of competitiveness

### **B. Revealed Symmetric Comparative Advantage (RSCA)**

The Revealed Symmetric Comparative Advantage measure reflects the RCA in its symmetric form as an index of competitiveness.

$$RSCA = \frac{RCA - 1}{RCA + 1} \quad (2)$$

Where the RSCA ranges from [-1 to +1]. The closer the value is to +1, the higher the competitiveness of a country in the commodity of interest.

### **C. Multiple OLS Regression**

In assessing the determinants of export competitiveness, the study applied an econometrics technique, a multiple OLS analysis, using different variables identified according to various studies conducted on export competitiveness. Export competitiveness is indexed by the RSCA and will be explained by the independent variables which include domestic production of coffee, the price of domestic currency per unit of foreign currency, the volume of export, world coffee price, domestic consumption and domestic producer price. The OLS regression equation will be:

$$RSCA_t = F [DPC_t, EXR_t, EXP_t, WCP_t, DCC_t, DPP_t] \quad (3)$$

Where,

- $RSCA_t$  = Revealed Symmetric Comparative Advantage at time  $t$
- $DPC_t$  = Domestic Production of Coffee (tons) at time  $t$
- $EXR_t$  = Exchange Rate of Birr in terms of USD at time  $t$
- $EXP_t$  = Export volume of coffee at time  $t$
- $WCP_t$  = World Price Coffee at time  $t$

DPPt = Domestic Producers Price at time t

DCCt = Domestic consumption of coffee at time t

The above expression can be rewritten as follows after it is transformed into a log-log form of equation:

$$\text{LnRSCAt} = \beta_0 + \beta_1 \text{LnDPCt} + \beta_2 \text{LnEXRt} + \beta_3 \text{LnEXPt} + \beta_4 \text{LnWCpt} + \beta_5 \text{DPPt} + \beta_6 \text{DCCt} + \varepsilon_t \quad (4)$$

Where,  $\varepsilon_t$  = white noise error term and others are log-form of the variables presented above.

Both the dependent and explanatory variables are expressed in a logarithmic form, the coefficients  $\beta_1$ -  $\beta_6$  take to mean the elasticities. Of all those coefficients, the sign of the first three betas are attention-grabbing testing the hypothesis developed above.

**Table 1: Description of variables and source of data**

| <b>Var</b> | <b>Description</b>  | <b>Expected Sign/Remark</b>   |
|------------|---|---|
| RCA        | Is composed of four important variables: World total export of all products, World total export of coffee, Ethiopia total export of all products, Ethiopia total export of coffee.  | Not in the regression   |
| RSCA       | Revealed Systematic Comparative Advantage of coffee obtained from the results of RCA  | Dependent variable  |
| DPC        | Domestic production of coffee in tons is taken from ICO   | Higher production implies higher export level.                                    |
| EXR        | Exchange rate of domestic currency in terms of foreign currency. Equivalently this can be used for the degree of devaluation  | Devaluation motivates domestic exporters expected to have positive effect         |
| EXP        | A time series data on total export of coffee taken at HS code of 2 digits. For this paper, it is taken from ITC but cross checked with the data from ICO. Increasing totals does not necessary mean that Ethiopia is more competitive. It instead depends on the total export of the country and the ratio of world coffee export to world total export of all products | Can be positive or negative   |
| WCP        | Data on World Price of coffee is obtained from International Coffee Organization data base and the higher the international price of coffee is, the higher exporters will tend to sell abroad.  | Positively related  |
| DPP        | Domestic producer's price of coffee will have an adverse effect on the motivation of domestic exporters to export their product to the rest of the world. Exporters will find it profitable to sell their product domestically provided that the relative price is higher.  | Negative effect   |
| DCC        | Domestic consumption of coffee is simply obtained from the difference of domestic production and total export of the sector.  | Potential negative effect on export performance and then competitiveness as well. |

## 4. Data Presentation, Analysis and Discussion

### 4.1 Overall Trade Performance of Ethiopia

As discussed above, the degree of openness to international trade shows how much an economy is exposed to international relationships or the degree of integration with the external market. Developing countries export primary products (agricultural products) for cheap international prices and import in turn capital goods including machinery, chemicals and automobiles for higher prices causing trade balance deficits. Ethiopia's circumstances today are no different from those under which the trade balance of the country has been in deficit for the last decade or so.

According to the expenditure approach of measuring GDP, if imports exceed exports then the GDP of a country will deteriorate, other things being constant. However, this deterioration can be counterbalanced and compensated by the gains resulting from imports.

**Table 2: The Trends of Export and Import for Ethiopia from 2008 -2016 in Billions of Birr**

| Indicators      | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   | Average |
|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Economic Growth | 8.69   | 12.66  | 13.07  | 8.65   | 10.58  | 10.26  | 10.39  | 7.34   | 10.9   | 10.28   |
| Export Value    | 42.88  | 42.97  | 62.72  | 85.95  | 77.04  | 77.26  | 79.44  | 70.53  | 64.74  | 67.06   |
| Growth          | -0.57  | 0.22   | 45.96  | 37.04  | -10.36 | 0.28   | 2.82   | -11.22 | -8.20  | 6.22    |
| Import Value    | 115.93 | 117.43 | 151.87 | 162.49 | 177.01 | 179.39 | 198.56 | 228.17 | 224.62 | 172.83  |
| Growth          | 6.65   | 1.30   | 29.32  | 6.99   | 8.94   | 1.34   | 10.69  | 14.91  | -1.56  | 8.73    |
| Trade balance   | -73.05 | -74.46 | -89.15 | -76.54 | -99.97 | -102.1 | -119.1 | -157.7 | -159.9 | -105.77 |
| Openness, % GDP | 42.69  | 39.67  | 47.11  | 48.23  | 45.40  | 41.47  | 40.74  | 39.66  | 35.79  | 42.31   |

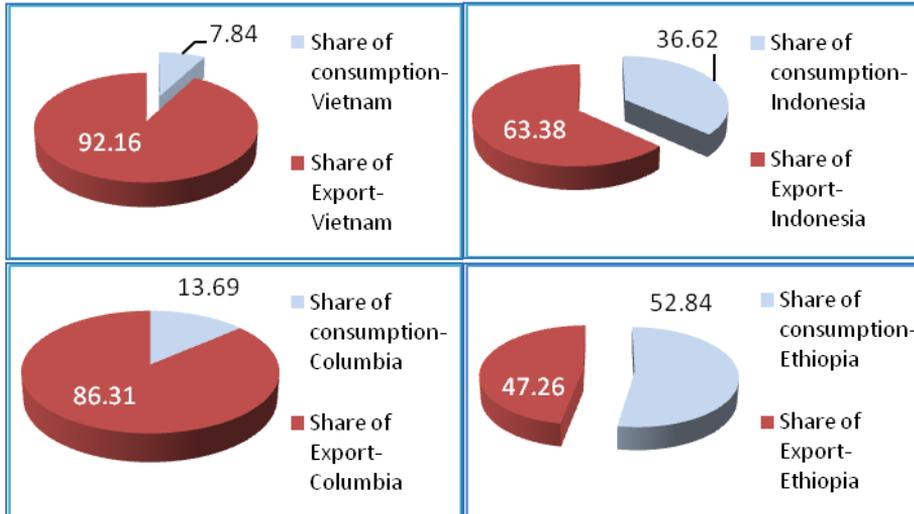
Source: NBE and authors' computation

#### **4.1.1 Coffee production, consumption and export performance of top producers in the world**

Ethiopia is one among the largest producing and exporting countries of coffee products in the world. Coffee production has contributed substantially to both domestic and foreign earnings in the country. Moreover, coffee also serves as a primary source of labour, especially for rural smallholder farmers. Ethiopia is fifth in the world in total production, according to statistics from the International Coffee Organization, and many of its Arabica beans are recognized internationally for their high quality. However, in this birthplace of coffee, a conflict is brewing over who gets Ethiopia's best beans. The government wants dollars to build infrastructure, and so it has ambitious targets to increase coffee exports, capitalizing on world-wide demand for its high-end Arabica beans. But Ethiopians, Africa's top coffee consumers, want to keep the beans at home; and with urban incomes rising, Ethiopian coffee drinkers increasingly want better quality. In most cases, the domestic price is higher than international prices and as a result, exporters are reluctant to export their product into international markets. They prefer to sell their product at home rather than export to the rest of the world. The government wants exports to be promoted to raise hard currency.

The pie charts below are drawn-up using the average data from 2010-2016 extracted from International Coffee Organization for the purpose of comparison. They show the shares of coffee consumed domestically on average, Vietnam exported over 92 percent of its total production and domestic coffee consumption is only about 8 percent. Coffee has been the major source of foreign exchange and domestic consumption has remained small. Similarly, Columbia has exported over 86 percent of its production annually with only 14 percent is consumed at home. Indonesia and Brazil have been larger domestic consumers but both have kept exports significantly higher than domestic consumption. By contrast, in Ethiopia for the last seven years, while domestic consumption and export volume have almost balanced, domestic consumption has continued to be slightly higher than export volume.

**Figure 1: Share of domestic consumption and export volume for the top five coffee growers**



While demand for specialty coffee is creating a new and expanding market for Ethiopian beans, the push to export also comes as coffee countries face steep competition. Currency devaluations in the world’s largest Arabica producers have pushed farmers to export beans, but Ethiopia is also competing against other African producers like Uganda, Kenya and Tanzania to export premium beans, and these are countries in which people mostly drink tea and produce coffee largely for export. Without gains in production and with steady competition at home, Ethiopia’s answer may not lie in exporting more coffee but in simply charging more.

Compared to top coffee producers like Brazil and Vietnam, domestic consumption of coffee in Ethiopia is far larger. The level of export for other top producers is usually significantly greater than the quantity of coffee being consumed domestically. In Ethiopia, according to the data extracted from the International Coffee Organization, the average share of coffee being exported and consumed domestically for the last ten years is estimated to be 47.26 percent and 52.84 percent respectively.

Though there have been fluctuations in the quantity of coffee produced and the export levels of coffee, the amount of coffee consumed domestically shows no decrease, rather the reverse. Indeed, any decrease in

domestic production is reflected solely in a decrease of export volume. Whenever, domestic production levels decrease, export volume decreases but not domestic consumption.

**Table 3: The growth rate of domestic coffee production, domestic coffee consumption and export in ‘1000 sixty-kilogram bags**

| <b>Year</b> | <b>Domestic production</b> | <b>Growth-Rate</b> | <b>Domestic consumption</b> | <b>Growth-Rate</b> | <b>Export</b> | <b>Growth-Rate</b> |
|-------------|----------------------------|--------------------|-----------------------------|--------------------|---------------|--------------------|
| 2005        | 5550.74                    | -                  | 2748                        | -                  | 2802.74       | -                  |
| 2006        | 5966.68                    | 7.49               | 2894                        | 5.31               | 3072.68       | 9.63               |
| 2007        | 4948.99                    | -17.06             | 3048                        | 5.32               | 1900.99       | -38.13             |
| 2008        | 6931.20                    | 40.05              | 3210                        | 5.31               | 3721.20       | 95.75              |
| 2009        | 7500.38                    | 8.21               | 3383                        | 5.39               | 4117.38       | 10.65              |
| 2010        | 6798.41                    | -9.36              | 3383                        | 0.00               | 3415.41       | -17.05             |
| 2011        | 6233.01                    | -8.32              | 3400                        | 0.50               | 2833.01       | -17.05             |
| 2012        | 6427.44                    | 3.12               | 3550                        | 4.41               | 2877.44       | 1.57               |
| 2013        | 6575.26                    | 2.30               | 3625                        | 2.11               | 2950.26       | 2.53               |
| 2014        | 6713.98                    | 2.11               | 3700                        | 2.07               | 3013.98       | 2.16               |
| 2015        | 7296.98                    | 8.68               | 3725                        | 0.68               | 3571.98       | 18.51              |
| 2016        | 7650.00                    | 4.84               | 3750                        | 0.67               | 3950.00       | 10.58              |

Source: ICO

The trend of domestic coffee consumption has continuously increased over time, while the lines for domestic production and export of coffee show fluctuations. Roughly speaking, the quantity of domestic consumption of coffee exceeded the level of coffee exports between 2010 and 2015 and from 2015 has started to be balanced. This shows the domestic demand for coffee is continuously increasing and the Ethiopian people are strengthening their tradition of drinking more cups of coffee, and this in turn results in higher domestic prices. When domestic prices increase and become relatively higher than international prices, exporters always seek to sell their product domestically, despite the government strategy of export promotion to accumulate hard currency. Shortages of foreign currency affect the government’s financial capacity to import products from the rest of the world. A combination of these circumstances affects the overall economy adversely.

## **4.2 Empirical Analysis**

### **4.2.1 Revealed comparative advantage**

The Revealed Comparative Advantage (RCA) is an index used in international economics for calculating the relative advantage or disadvantage for a certain country in a certain class of goods or services as evidenced by trade flows.

This study has conducted a RCA index analysis for Ethiopia and other top producers/exporters in order to assess the degree of advantage or disadvantage that they have in the international market. As discussed above, a RCA index greater than one indicates countries have a comparative advantage in the sector whereas a RCA index less than that offers a comparative disadvantage in the international market.

Table 4 shows a comparison of the Revealed Comparative Advantage indexes for coffee for the period of 2006 to 2016 based on the data extracted from the UNCTAD-ITC database. The RCA indices of Ethiopia and other countries including the top producers of coffee in the world (Brazil, Vietnam, Columbia and Indonesia) and in Africa (Ethiopia, Uganda and Kenya) are summarized for comparison. The table indicates that the RCA index of coffee for all the countries is greater than 1 which indicates that all of these countries gain comparative advantage from their coffee exports.

Ethiopia's coffee sector in general enjoys significant comparative international advantages owing to its quality, production potential and available raw materials, highly disciplined workforce and reasonable prices; and it boasts the largest RCA.

Given the comparative advantages of coffee, the product has the potential to gain a significant market share in the global market and to become a world class supplier of high quality processed and raw coffee beans, though a value-added export is more recommended than exporting the raw product. However, the extent to which these comparative advantages translate into a competitive advantage on international markets depends on a number of other factors, especially the overall technical efficiency of the sector, labour productivity, and the quantity and quality of the locally supplied raw materials.

**Table 4: Revealed Comparative Advantage of Ethiopia and the Top Producers**

| Country | RCA<br>Ethiopia | RCA<br>Brazil | RCA<br>Vietnam | RCA<br>Columbia | RCA<br>Indonesia | RCA<br>Uganda | RCA<br>Kenya |
|---------|-----------------|---------------|----------------|-----------------|------------------|---------------|--------------|
| 2006    | 330.43          | 17.34         | 24.72          | 49.32           | 4.72             | 159.60        | 31.91        |
| 2007    | 254.96          | 16.50         | 30.72          | 45.01           | 4.34             | 154.81        | 31.56        |
| 2008    | 255.80          | 15.34         | 24.57          | 37.14           | 5.27             | 170.40        | 22.26        |
| 2009    | 142.23          | 15.42         | 18.86          | 29.83           | 4.40             | 111.25        | 28.06        |
| 2010    | 187.24          | 16.08         | 15.99          | 29.99           | 3.22             | 109.44        | 25.04        |
| 2011    | 162.79          | 15.76         | 14.32          | 23.45           | 2.56             | 108.64        | 19.19        |
| 2012    | 178.16          | 13.15         | 17.20          | 18.03           | 3.65             | 87.72         | 24.28        |
| 2013    | 156.31          | 12.69         | 12.91          | 21.83           | 4.30             | 118.02        | 23.02        |
| 2014    | 155.62          | 15.89         | 13.03          | 27.14           | 3.49             | 107.12        | 22.36        |
| 2015    | 154.64          | 15.66         | 8.02           | 38.83           | 4.28             | 95.53         | 22.67        |
| 2016    | 143.82          | 13.60         | 7.98           | 41.22           | 3.62             | 77.65         | 23.40        |
| Average | 192.91          | 15.22         | 17.12          | 32.89           | 3.99             | 118.20        | 24.89        |

Source: Authors' calculation of data extracted from ITC

The RCA index of the coffee of Ethiopia is much higher than the other countries including the largest coffee producer, Brazil, pointing to a promising capacity for exploitation relative to other countries. However, given other constants, these RCA figures are simply used for the sake of comparison between the top coffee exporters. A RCA index does not necessarily mean the comparative advantage is absolutely higher for Ethiopia compared to others. There are various other factors to be considered including the total export of all products of the countries viz-a-viz the total export of coffee. Other countries have more diversified exports than Ethiopia which mainly depends upon coffee as a source of forex.

We noted earlier that the RCA is the ratio of two different ratios, that is, a share of a country's total exports of the commodity of interest divided by total exports, and volume and its share of the world total export volume of the product against total world exports. The decreasing trend of Ethiopia's RCA in the coffee sector shows that the composition of the exportable products of the country is expanding. We argue that the export sector of Ethiopia is dominated by few products, and the composition is increasing as

shown in the increase of the volume of Ethiopia’s total export of all products compared to the export volume of coffee. Ethiopia is now experiencing a decreasing comparative advantage, but its RCA has been stable over years and remains substantially much greater than other countries investigated in this study.

#### **4.2.2 Revealed systematic comparative advantage**

In addition to the RCA, this study also carried out a RSCA analysis to investigate the export competitiveness of coffee for the period 2006-2016. For the purpose of comparison, the coffee export data of the top coffee growers both worldwide and in Africa were considered. RSCA ranges from -1 to +1. The closer the value is to +1, the higher the competitiveness of a country in the commodity of interest.

**Table 5: RSCA index of top coffee producers and exporters**

| <b>Country</b> | <b>RSCA Ethiopia</b> | <b>RSCA Brazil</b> | <b>RSCA Vietnam</b> | <b>RSCA Columbia</b> | <b>RSCA Indonesia</b> | <b>RSCA Uganda</b> | <b>RSCA-Kenya</b> |
|----------------|----------------------|--------------------|---------------------|----------------------|-----------------------|--------------------|-------------------|
| 2006           | 0.99397              | 0.89093            | 0.92225             | 0.96025              | 0.65054               | 0.98755            | 0.93922           |
| 2007           | 0.99219              | 0.88570            | 0.93695             | 0.95653              | 0.62556               | 0.98716            | 0.93858           |
| 2008           | 0.99221              | 0.87763            | 0.92179             | 0.94755              | 0.68118               | 0.98833            | 0.91403           |
| 2009           | 0.98604              | 0.87822            | 0.89931             | 0.93513              | 0.62975               | 0.98218            | 0.93118           |
| 2010           | 0.98938              | 0.88292            | 0.88230             | 0.93546              | 0.52610               | 0.98189            | 0.92321           |
| 2011           | 0.98779              | 0.88065            | 0.86946             | 0.91821              | 0.43829               | 0.98176            | 0.90092           |
| 2012           | 0.98884              | 0.85864            | 0.89011             | 0.89492              | 0.57022               | 0.97746            | 0.92089           |
| 2013           | 0.98729              | 0.85390            | 0.85619             | 0.91240              | 0.62234               | 0.98320            | 0.91673           |
| 2014           | 0.98723              | 0.88158            | 0.85741             | 0.92893              | 0.55453               | 0.98150            | 0.91439           |
| 2015           | 0.98715              | 0.87998            | 0.77825             | 0.94979              | 0.62154               | 0.97928            | 0.91552           |
| 2016           | 0.98619              | 0.86297            | 0.77734             | 0.95263              | 0.56711               | 0.97457            | 0.91805           |
| Average        | 0.98893              | 0.87574            | 0.87194             | 0.93562              | 0.58974               | 0.98226            | 0.92115           |

Source: Authors’ computation using UNCTAD-ITC database

The index of RSCA is closer to +1 for the product throughout this period indicating that Ethiopia held comparative advantage in the sector in the world market. Looking at the average Revealed Systematic Comparative Advantage index of Ethiopia, 0.98893, it is very close to one. This indicates

that, the sector is internationally competitive in the world market for coffee and it is considered preferable to others, due to taste and quality relative to other countries.

Generally, the results of both the Revealed Comparative Advantage and the Revealed Symmetric Comparative Advantage indices demonstrate Ethiopia's comparative advantages in the export of coffee. It is true that if the RCA indicates a country has a comparative advantage over a specific product, then it is likely to get a RSCA closer to an index 1. The reverse also holds true, with a comparative disadvantage, the RSCA index will be negative and closer to -1. In this specific table, the RSCA of all the top exporting countries is positive and show significantly larger figures.

#### **4.2.3 OLS regression result**

Prior to running the OLS regression on the determinants, all the variables included in the model needed to be checked for their stationarity. In most cases, economic variables are non-stationary at their level. However, in a few circumstances, time series data sets can be stationary if a growth is being used. According to A.H. Studenmund (2014), any time series whose mean and variance do not change with time is a stationary series. That is if both mean and variance are not varying over time and if the correlation coefficient of variables and the lagged variables depend on the lag lengths, then the time series is said to be a stationary time series. If either of the above properties is violated, that is if neither a mean nor variance change with time then the series is non-stationary. If a non-stationary variable is being regressed on another non-stationary dependent variable, the result will lead to a spurious regression (M. Verbeek, 2004) in which inferences based on such regression would be confusing and estimators provide false estimators.

In order to know whether the variables included in our model are stationary or non-stationary and to make sure that the regression result obtained is not spurious, it is best to use a non-stationary test, a Unit Root Test as indicated in Studenmund (2014). Then, after having all variables included in the specified model being stationary, the problem of spurious regression will not be relevant. Traditionally, sketching a time series plot of variables can be used to identify if the series is stationary or non-stationary by simply looking to see if it is trending up or trending down.

In this study, the researcher has used an ADF-test to check the stationarity of the variables. All the variables were found non-stationary at their level after being transformed into logarithmic form. Regressing the non-stationary variables on some non-stationary variables will not help to investigate the determinants of coffee export, so we must difference the variables to convert them into stationary data. Variables should be continuously differenced until they are found to be stationary. In line with this, all the variables become stationary after differencing them once with the exception of domestic coffee consumption level which only became stationary after the second differencing. The following table presents the detailed ADF test of stationarity.

**Table 6: Unit root test of stationarity using Augmented Dickey Fuller**

|       |                | Augmented Dickey Fuller Test  |                            |                                       | Remark |
|-------|----------------|-------------------------------|----------------------------|---------------------------------------|--------|
|       |                | P-Value<br>(without constant) | P-Value<br>(with constant) | P-Value<br>(with constant<br>& trend) |        |
| RCA   | Level          | 0.4194                        | 0.5088                     | 0.8671                                |        |
|       | 1st difference | 0.0000***                     | 0.0011***                  | 0.0051***                             | I(1)   |
| LnDCC | Level          | 0.06609                       | 0.1667                     | 0.3770                                |        |
|       | 1st difference | 0.2387                        | 0.4787                     | 0.1582                                | I(2)   |
| LnDPC | 2nd difference | 0.0000***                     | 0.0000***                  | 0.2778                                |        |
|       | Level          | 0.9992                        | 0.6991                     | 0.0013                                | I(1)   |
| LnEXR | 1st difference | 0.0000***                     | 0.0000***                  | 0.0000***                             |        |
|       | Level          | 0.9999                        | 0.9834                     | 0.0000***                             | I(1)   |
| LnDPP | 1st difference | 0.0000***                     | 0.0000***                  | 0.0000***                             |        |
|       | Level          | 0.7645                        | 0.3740                     | 0.5146                                | I(1)   |
| LnEXP | 1st difference | 0.0000***                     | 0.0006***                  | 0.0037***                             |        |
|       | Level          | 0.9775                        | 0.6677                     | 0.0000***                             | I(1)   |
| LnWPC | 1st difference | 0.0000***                     | 0.0000***                  | 0.0593*                               |        |
|       | Level          | 0.7610                        | 0.3651                     | 0.1635                                | I(1)   |
|       | 1st difference | 0.0000***                     | 0.0005***                  | 0.0034***                             |        |

Source: Authors' computation using GRETL

\*, \*\*, \*\*\* shows the significance level at 10%, 5% and 1% respectively.

H0: Not Cointegrated is tested against H1: variables are cointegrated.

After checking for the stationarity of variables and ensuring they are stationary the next task is running the OLS regression. In order to investigate

the main magnitude of the determinants of export competitiveness in the case of Ethiopia, this study has considered, export volumes, exchange rates, domestic production levels, domestic consumption levels, world coffee prices and domestic producer prices. A simple OLS regression was performed using the log-log form where the variables are changed using logarithmic form.

With regard to the signs of the explanatory variables, the following table reveals that signs are as expected as we hypothesized during the earlier steps of this research. In this model, all the explanatory variables (export volume, exchange rate, domestic production, level, domestic consumption level and world coffee price) are found to be significant at 1% though the domestic producer price is insignificant at any level.

**Table 7: Model: OLS, using observations 1991-2017 (N = 27)**

Dependent variable:  $l\_RCA$

HAC standard errors, bandwidth 2 (Bartlett kernel)

|                    | <b>Coefficient</b> | <b>Std. Error</b>  | <b>t-ratio</b> | <b>p-value</b> |     |
|--------------------|--------------------|--------------------|----------------|----------------|-----|
| Intercept          | 11.6818            | 3.90712            | 2.9899         | 0.0072         | *** |
| LogDCct            | -19.5915           | 3.88929            | -5.0373        | <0.0001        | *** |
| LogDPCt            | 25.4453            | 6.09525            | 4.1746         | 0.0005         | *** |
| LogEXPt            | 11.4011            | 2.75193            | 4.1430         | 0.0005         | *** |
| LogEXRt            | 2.17949            | 0.458655           | 4.7519         | 0.0001         | *** |
| LogDPt             | -0.702225          | 0.432469           | -1.6238        | 0.1201         |     |
| LogWPt             | 1.50055            | 0.365848           | 4.1016         | 0.0006         | *** |
| Mean dependent var | 4.661525           | S.D. dependent var | 0.987188       |                |     |
| Sum squared resid  | 3.712978           | S.E. of regression | 0.430870       |                |     |
| R-squared          | 0.853462           | Adjusted R-squared | 0.809501       |                |     |
| F(6, 20)           | 33.81780           | P-value(F)         | 1.88e-09       |                |     |
| Log-likelihood     | -11.52731          | Akaike criterion   | 37.05461       |                |     |
| Schwarz criterion  | 46.12547           | Hannan-Quinn       | 39.75185       |                |     |
| Rho                | 0.301819           | Durbin-Watson      | 1.324771       |                |     |

Therefore, the equation according to the output using the GRETL Software package can be rewritten as follows:

$$\text{LogRCA}_t = 11.682 - 19.56\text{LogDCC}_t + 25.45\text{LogDPC}_t + 11.4\text{LogEXP}_t + 2.18\text{LogEXR}_t + 1.50\text{LogWCP}_t$$

(3.907)      (3.889)      (6.095)      (2.752)      (0.459)      (0.366)

N = 27 year

R<sup>2</sup> = 85%

Adjusted R<sup>2</sup> = 81%

Values in parenthesis are standard errors

As presented in the table, domestic production level of coffee, the exchange rate, export volume of the product and world price of coffee all affect the degree of competitiveness positively and this relationship is statistically significant. However, domestic consumption level and export competitiveness are negatively related and this relationship is also statistically significant. The domestic producer price has a negative implication on the degree of competitiveness, though this impact is statistically insignificant.

We looked at the sign and magnitude of the effects of a unit change in the independent variables on the export competitiveness where it is measured by the RCA index for comparison purpose with those regressors that affect competitiveness. [[This now makes sense to me – does it to the authors??]] Referring to model above, on average with all things being equal, a one-unit change in the domestic consumption level shows a 19.6 percent change in the Revealed Comparative Advantage index of the country. More specifically, when the domestic consumption of coffee increases /decreases by 1 percent, on average, the export competitiveness of coffee will decrease/increase by 19.6 percent. This result is consistent in line with the findings of D. Boansi and C. Crentsil (2013). Tadesse G. (2015) investigated the major determinants of coffee export supply in Ethiopia for the period of 1981-2011 using VAR and an Error Correction Model. The findings of his study indicated that the real export price of coffee, domestic production of coffee and world supply of coffee significantly affected coffee export supplies.

However, in Ethiopia what is domestically consumed is part of the coffee which the ECX has refused to export due to problems of quality. Not all domestic consumption is of low quality non- exportable coffee, but much of it is. As a result, the figures may not correctly indicate the impact of domestic consumption of coffee on the sector's export competitiveness. Ethiopia also exports different types coffee including washed and unwashed,

roasted and unroasted, and these may also provide differences on pricing. We have used a 2-digit HS code that the UNCTAD ITC data base generates for this specific product.

On average, a one percent change in the domestic production of coffee and the export volume of coffee leads to 25.44 percent and 11.4 percent changes in the export competitiveness respectively. Holding everything to be constant, a 1 percent change in the value of domestic currency in terms of foreign currency, normally dollars will have an impact of 2.18 percent change in the export competitiveness of coffee. Yusuf M and Gnul M. (2013) have found that the export volume has a positive impact on the export competitiveness of a country. Our findings are compatible with their results.

Generally speaking, most of the results we obtained are consistent with the hypothesis or expected sign of independent variables included in the model to explain the export competitiveness with the exception of the domestic producer's price of coffee, found to have a positive but statistically insignificant effect. We started our regression including the ratio of world price to domestic price as regressors but then found these to be correlated with one or more of the explanatory variables and therefore excluded them.

Regarding the diagnosis, the study has performed different procedural tests (including Autocorrelation using Durbin-Watson, Heteroskedasticity using White tests, Multicollinearity using VIF, Outlier using CUMSUM1) to come up with this final stage. It is evident the model specification we followed does not exhibit any statistical problems and as a result can be taken as a good representation of the variables.

The accuracy of the fit (R-squared and Adjusted R2) of the model elaborates considerable relationship of the variables. About 85.3 percent (using R-squared) and about 81 percent (using Adjusted R2) of variations in the export competitiveness of coffee are described by the variations in the independent variables included in the model. The Durbin-Watson statistic also shows that the error terms are not serially correlated.

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<sup>1</sup> See the outcome of those diagnosis tests in the annex

## **5. Conclusions and Recommendations**

### **5.1 Conclusions**

This study has aimed to identify the factors that affect the export competitiveness of the coffee sector in Ethiopia. Its conclusions:

According to data from ITC, more than half of the total amount of domestic coffee production is domestically consumed; only 47.26 percent of production is exported to the rest of the world. Top coffee producers export most of their production. The domestic consumption level of coffee in Ethiopia is increasing with time.

The RCA index of coffee for all the countries considered is greater than 1 which indicates that all these countries have a comparative advantage from the export of the product. Ethiopia's coffee sector in general enjoys significant international comparative advantages owing to its quality, production potential and available raw materials, highly disciplined workforce and cheap prices. Both Revealed Comparative Advantage and Revealed Symmetric Comparative Advantage show that Ethiopia has a comparative advantage in export of coffee.

Domestic consumption level of coffee affects the export competitiveness of the product adversely and this relationship is statistically significant. Higher consumption level at domestic level means export competitiveness will be reduced.

All other variables including domestic production level, world price of coffee, exchange rate and export volume are found to affect the export competitiveness positively and the effect is significant. Domestic producer price also affect the export performance of the sector positively, but the effect is statistically insignificant.

Results for the RCA and RSCA show that Ethiopia is experiencing a decreasing comparative advantage, but it has continued to remain much greater than other countries considered.

### **5.2 Recommendations**

In order to enhance Ethiopia's competitiveness in the coffee market amid anticipated increases in supply-side competition in the near future,

measures should be put in place to address current inefficiencies in the supply side. These should include most importantly management of price risk (affected by the volatile nature of coffee prices, both domestic and international and the gap between time of purchase of beans from buyers and sale of it to exporters), quality control, smuggling, and transaction costs. This could be achieved to large extent by reducing the gap between time of purchase of the berries/beans from buyers and the time of auction, setting high quality standards for the beans to be auctioned, and closely watching non-auctioned exports, ensuring payment of fairer prices to growers and appropriate transmission in times of increment, and by putting in place measures to reduce the number of intermediaries in the supply chain to help minimize unnecessary competition. Finally, we would recommend appropriate and significant investment in yield-enhancing innovations for the coffee sector.

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