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TRADE BETWEEN EGYPT, SUDAN AND ETHIOPIA:
PROSPECTS AND CHALLENGES
FOR TRILATERAL TRADE INTEGRATION

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Abstract

Egypt, Sudan and Ethiopia possess potential natural and human resources, which can entail successful trade integration between the three countries. This paper investigates the performance of trilateral trade between Egypt, Sudan and Ethiopia. The study also analyzes the prospects and challenges for trade expansion between these countries. The study used the gravity model beside diversification and product complementarity indices to identify the pattern and structure of trade between the three countries. The analysis revealed that Egypt is the most diversified economy, which can lead trade in the region. Moreover, the paper indicated that there are some challenges facing the implementation of any trade arrangements between these countries, including: export concentration, poor infrastructure and political instability. Finally, the paper concludes with some recommendations to facilitate free trade between the three countries.

JEL Classification: F1

Keywords: Trilateral integration, Gravity model, complementarity index, diversification index

ملخص

تمتلك كل من مصر والسودان وإثيوبيا الموارد الطبيعية والبشرية المحتملة، والتي يمكن أن تنطوي على التكامل التجاري الناجح بين الدول الثلاث. تبحث هذه الورقة في أداء التجارة الثلاثية بين مصر والسودان وإثيوبيا. كما تحلل الدراسة آفاق وتحديات التوسع التجاري بين هذه الدول. استخدمت الدراسة نموذج الجاذبية بجانب مؤشرات التنوع والتكامل المنتج للتعرف على نمط وهيكل التجارة بين الدول الثلاث. وكشف التحليل أن مصر هي الاقتصاد الأكثر تنوعاً، والتي يمكن أن تؤدي التجارة في المنطقة. وعلاوة على ذلك، أشارت الدراسة إلى أن هناك بعض التحديات التي تواجه تنفيذ أي ترتيبات تجارية بين هذه الدول، بما في ذلك: تركيز الصادرات، وضعف البنية التحتية وعدم الاستقرار السياسي. وأخيراً، تختتم الورقة ببعض التوصيات لتسهيل التجارة الحرة بين الدول الثلاث.

1. Introduction

Free trade between neighboring countries has been considered as a potent tool for economic growth and development. Indeed, trade encourages production and efficiency and reduces poverty through broadening production base, facilitating exports diversification, enhancing competitiveness and encouraging innovations (Dollar and Kray, 2002 and Winters, et al, 2004). It has been acknowledged that trade transfers advanced technologies, knowledge and innovations between countries and in turn promote growth and development (Grossman and Helpman, 1991; Romer, 1993 and Barro and Sala-i-Martin, 1995). Moreover, the flow of goods and services between countries promotes the social and political relations and enhances peace between nations (McDonald, 2004; Fearon, 1995 and Gartzke, 1999).

The trade relation between Egypt, Sudan and Ethiopia (ESE hereafter) is very mature and dating back to a couple of centuries. These countries have overlapped cultural, historical and religious heritage, and share an important water source (i.e. The Nile River). ESE also has diversified natural and human resources, rendering these countries have a potential economic power in the region. Moreover, these countries play an imperative role in the economic and political situation of Africa. All these factors would make trade and economic integration between ESE is a successful policy option that can contribute to economic growth and development of the region.

ESE has undergone a remarkable increase in the bilateral trade in recent decades, particularly after the establishment of Common Market for East and Southern Africa (COMESA) in 1993. Despite the improvement of bilateral trade between these countries, the actual intra-trade is less than expected. Therefore, understanding the factors that influence trade between ESE would be very useful in prescribing appropriate policies that aim to enhance trilateral trade between these countries. In addition, as long as these countries possess potential resources, investigating the prospects and challenges for trade arrangements between them will be useful to uncover the strengths and weaknesses of forming free trade arrangements between them.

The importance of this paper is to fill a gap in the literature, as the issue of trade relations between neighboring African countries has not been adequately studied. In addition, these countries have experienced many transformations in the last two decades. Therefore, understanding the patterns and challenges of trade between these countries would help in guiding appropriate trade policies that foster trilateral trade flow between them.

This paper is organized in six sections as follows. Section two outlines some stylized facts about the ESE economies. Section three discusses the trend of bilateral trade between ESE countries as well as their share in COMESA integration. Section four identifies the factors that influencing bilateral trade between ESE using gravity model. Section five analyzes the prospects and challenges for trilateral trade integration between ESE. Finally, section six concludes with some policy recommendations regarding improvement of trade between ESE.

2. Some Basic Economic Indicators for Egypt, Sudan and Ethiopia

2.1 Egyptian economy

Egyptian economy is one of the biggest economies in Africa, recorded positive and stable economic growth rate during the last thirty years. In terms of population, Egypt is considered as the third largest country in Africa after Nigeria and Ethiopia. According to recent statistics, the Egyptian population is estimated to be about 86 million in 2014. In addition, Egyptian people enjoy high GDP per capita compared to other countries understudy (i.e. Sudan and Ethiopia). Specifically, the GDP per capita increased dramatically in the last three decades from about 719 US\$ in (1980-1985) to about 1440 US\$ in 2012 (see Table 3).

Regarding the structure of the Egyptian economy, Table 1 shows that unlike other African countries the agricultural sector in Egypt has the lowest contribution to GDP, with share do not

exceeds on average 20% during the last thirty years. However, the service is a leading sector in the Egyptian economy contributing to total GDP with about 50%, over such period. Moreover, the industrial sector is the second largest source of GDP and accounts for about 34% out of total GDP. As indicated from the table, the share of agriculture in GDP decreased from 19.6% in (1980-1985) to 18.8% in (2006-2010); the share of services in GDP decreased from 47.94% in (1980-1985) to about 48.8% during (2006-2010); the share of industry in GDP increased from 32.46% (1980-1985) to 37.43% during (2006-2010). This data implies that Egyptian economy experiencing transformation from agriculture to industry and service. This situation also indicates that Egyptian economy is more diversified than other country in the region, supporting the stable and positive growth of the Egypt, over the past thirty years.

As for the trade performance, Table 1 shows that Egyptian exports and imports increased remarkably during the recent decade. The volume of exports has increased about six folds during the period (1980-2010). However, the gap between imports and exports is very big over such period, implying that Egypt suffers from a chronic trade deficit. Moreover, the Table reveals that the trade-GDP ratio is very high, reporting on average about 55% during the last three decades.

2.2 Sudan economy

Sudan is the third largest country in Africa (after Algeria and Democratic Republic of the Congo) covers an area of 1,886,068 square kilometers. The country is one of the most geographically diverse states in Africa and endowed with a wide variety of natural resources rendering it suitable for agriculture. Specifically, the country has huge amount of arable land, livestock and water resources. Despite its largest area, Sudan hosts a few number of population (estimated at about 37 million in 2012) compared to Ethiopia and Egypt.

Sudan economy has undergone remarkable transformations in the last decades. That is, since its independence in 1956 and up to the date of oil exploitation in 1999, the country was reliant mainly on agriculture, which was the backbone of the economy. Subsequently, after the commercial exportation of oil, the economy has shifted to heavily dependence on oil revenue, which contributed with an average of 20% and 95 % to total GDP and exports earnings over the period 2000-2011. However, after the secession of South Sudan in 2001 and the loss of most of oil resources, Sudan suffered from many economic problems including high inflation rate, internal and external balance and unstable exchange rate.

As for the structure of the economy, since long, Sudan economy is depend primarily on agriculture which accounts for about 40% to GDP and employs about 70% of population. Like other developing countries the share of industry is small, particularly, manufacturing. The share of the sector service in GDP is significant and accounts for about 45% on average. However, the structure of the economy has changed obviously in last decades due to oil exploitation and secession of the South Sudan. Table 3 below show that the share of agriculture in GDP decreased from 44.86% in (1996-2000) to 26.87% in (2006-2010); the share of the services in GDP increased from (38.86)% in (1995-2000) to about 44.36% in (2006-2010); the share of industry in GDP increased from 16.38% in (1995-2000) to 28.76% in (2006-2010). The rapid increase in the share of industrial sector is attributed to the high share of oil industry during such period.

Regarding the trade performance of Sudan economy, Table 3 reveals that the value of Sudanese exports and imports increased during the period 1980-2010. As shown from the Table the value of exports during such period has increased more than ten times. The increase of exports is mainly due to oil exports over the period 2000-2011. The value of imports also has increased dramatically, benefited from the oil revenues. Notably, the gap between exports and imports has decreased in the last ten years, indicating positive effect of oil on trade balance. Moreover,

Sudan economy experienced higher rate of trade-GDP ratio in the last ten years compared to previous decades.

2.3 Ethiopian economy

Ethiopia is the second populist economy in Africa after Nigeria, hosting about 90 million of inhabitants. A large part of the Ethiopian population lives in poverty with low per capita income, accounted about less than US\$ 800 per annum on average in the last decade (World Bank, 2012). Like the other Sub Saharan Africa (SSA) countries, Ethiopia relies heavily on agriculture, which contributes with about 50% to total GDP and employs more than 80% of population and a source of about 75% of foreign exchange. Ethiopia is also endowed with a huge amount of natural resources, such as, arable land, water and livestock.

Over the last decade Ethiopian economy has undergone impressive growth performance with average GDP growth rate of 11 %, which is about the double of the average growth of Sub Saharan Africa (World Bank, 2014). As shown in Table 3 below, the growth rate of GDP has increased sharply during the last ten years reaching in average more than 10% during the period 2006-2010. In addition, the per capita GDP also increased sharply from 149.6 US\$ during 1980-1985 to about 201.80 US\$ in average during 2006-2010. Although the high growth rates in last decades, Ethiopian per capita GDP is very small reflecting the widespread of poverty and unfavorable economic situation in the country.

Regarding the contribution of economic sectors to total GDP, Table 3 reveals that agriculture is the largest sector in Ethiopian economy, and contributes with about 45% on average. However, the share of agriculture to GDP has decreased in recent years compared to 1990s decade. Like in other African countries, the share of industry in Ethiopian economy is very small with decreasing trend in the last ten years. However, the service sector is the second largest contributor to Ethiopian economy, with an upward trend in the last decade. As indicated in Table 3, the share of agriculture in GDP decreased from 57.7% during 1980-1985 to 47.56% over (2006-2010); the share of the services in GDP increased from 33.4% in (1980-1985) to about 40.8% in (2006-2010); the share of industry in GDP decreased from 9.8% in (1980-1985) to 11.5% during (2006-2010).

Regarding the trade performance, Ethiopia has registered a continuous increase in its exports and imports with high growth rates. However, the trade deficit remains high reflecting a huge gap between the value of exports and imports of the country. Moreover, the trade-GDP ratio increased remarkably in last decade from 25.69% in 1999 to 45.93% in 2012, reflecting the importance of external sector in the Ethiopian economy.

3. Trend of Trade between Egypt, Sudan and Ethiopia

Before analyzing the prospect and challenges for trilateral trade integration between Egypt, Sudan and Ethiopia, it is useful to highlight the trend of actual bilateral trade between each pair of the countries understudy.

3.1 Bilateral trade between Ethiopia and Sudan

Ethiopia shares its largest border with Sudan, which facilities the movement of goods and services between the two countries in both formal and informal levels. The history of trade relations between Sudan and Ethiopia is very old. In the last decades, the trade between the two countries has witnessed a sharp progress, particularly after the establishment of COMESA, as both countries are the main members of the treaty. Moreover, Ethiopia and Sudan have signed bilateral trade agreement in 2002 to foster free trade by eliminating barriers to trade and promoting free competition. Since then, the trade flow between the two countries has increased considerably. Furthermore, the advent of oil in Sudan in 1999 raised the bilateral trade between Ethiopia and Sudan, as most of Ethiopian oil imports were originated mainly from Sudan.

As shown in Figure 1, the total bilateral trade between Ethiopia and Sudan increased dramatically in the last decade. The value of Ethiopian exports to Sudan increased from about one million in 2000 to about 74 million in 2008 and then decreased to about 9 million in 2012. Likewise, the Ethiopian imports from Sudan increased from less than one million in 2000 to about 207 million in 2012. Furthermore, Figure 1 indicates that the trade between Sudan and Ethiopia has declined after 2011, which can be explained by the loss of 75% of Sudanese oil after the secession of South Sudan.

3.2 Trend of bilateral trade between Ethiopia and Egypt

The bilateral trade between Ethiopia and Egypt was very active in recent decade, but it is less than that between Ethiopia and Sudan. The low performance of bilateral trade between the two countries may be explained by the difference in culture and language and lack of common borders. However, the trend of bilateral trade between these countries has increased remarkably, as the two countries benefits from the preferential arrangement under COMESA treaty. Figure 2 below shows that the Ethiopian exports from Egypt increased from about 6 million in 2000 to about 26 million in 2012, while the Ethiopian imports from Egypt increased from about 15 million to 45 million in 2012. The development of trade between the two economies could be explained by the fact that Egyptian economy is a more diversified and one of the largest economies among the COMEA countries.

3.3. Trend of bilateral trade between Sudan and Egypt

Sudan and Egypt share common border, language and culture as well historical linkages. Accordingly, the bilateral trade between the two countries is high compared to bilateral trade between other pairs understudy. In the last two decades, the trade between these countries has witnessed a considerable expansion, particularly after the establishment of COMESA free trade area (FTA) in 2002. Indeed, Sudan and Egypt are the founders of COEMSA and engaged all COMESA' arrangements since its emergence in 1982.

As shown in Figure 3, the value of bilateral trade between Sudan and Egypt has grown rapidly during the past ten years, and increased from 66 million in 2000 to about 772 million in 2012. The Sudanese exports to Egypt rose from 38 million in 2000 to 133 million in 2012. Likewise, the value of Sudanese imports from Egypt increased from 27 million to about 639 million in 2012. This data indicates that the bilateral trade between Sudan and Egypt is much more than the bilateral trade between Sudan and Ethiopia, and between Egypt and Ethiopia.

3.4 The share of Egypt, Sudan and Ethiopia in COMESA trade

Egypt, Sudan and Ethiopia are the main founders of COMESA integration and participate in all trade arrangements since its establishment in 1993. Table 4 below presents the share of ESE in COMESA trade performance. As shown in Table 4, Egypt has a considerable contribution in COMESA' trade, with the share of 11.32% and 19.02% in 2000 and 2010, respectively. Egypt share about one fifth of intra-COMESA trade. This could be explained by the fact that Egypt is the most developed country in COMESA beside its comparative advantages in some industries. However, the share of Sudan and Ethiopia decreased during the period 2000-2010. In 2010 the contribution of Sudan and Egypt in intra-COMESA trade was about 3.3% and 6.36%, respectively.

4. Empirical Analysis

To examine the actual and potential performance of trilateral trade between Ethiopia, Sudan and Egypt, the study uses three approaches namely, the gravity model, diversification and the complementarities index. The gravity model is used to understand the factors that influencing the bilateral trade between these countries, while diversification and complementarities indices are used to assess the potential trade among ESE.

4.1 Factors influencing trade between Egypt, Sudan and Ethiopia: A gravity model analysis

The gravity model is widely employed in the literature to investigate the determinants of bilateral trade flow between countries. The gravity model was firstly used by Tinbergen (1962) and Linneman (1966) and later developed by (Anderson, 1979). In the recent decades, numerous studies examined regional integration and patterns of bilateral trade between countries have used gravity model since the model fits the others underpinning variables remarkably well (see Foroutan and Pritchett (1993), Elbadawi (1997), Lyakurwa et al. (1997) and Longo and Sekkat (2001) and Ogunkola (1994). For the case of Africa, many empirical studies have used gravity model to investigate the performance of trade between counties. For example, Chauvin and Gaulier (2002) used gravity model to investigate the potential of intra-SADC trade; Simwaka (2011) assessed the success of SADC free trade area over the period 1998-2007; recently, Ebaidalla and Yahia (2014) assessed the performance of intra-COMESA trade integration employing gravity model. Therefore, this study utilizes the gravity model to investigate possible obstacles for trilateral trade between ESE.

Based on the previous studies (e.g. Elbadawi 1997; Foroutan and Prichett 1993; Longo and Sekkat 2004; Gedaa and Kebret 2007), the estimable gravity model that used in our analysis could be specified as follows:

$$\begin{aligned} \ln \text{EXP}_{ijt} = & \alpha_{ij} + \beta_1 \ln \text{GDP}_{it} + \beta_2 \ln \text{POP}_{it} + \beta_3 \ln \text{GDP}_{jt} + \beta_4 \ln \text{POP}_{jt} + \\ & \beta_5 \ln \text{INFR}_{it} + \beta_6 \ln \text{INFR}_{jt} + \beta_7 \ln \text{INF}_{it} + \beta_8 \ln \text{INF}_{jt} + \beta_9 \ln \text{DIS}_{ij} + \beta_{10} \text{CL}_{ij} + \mu_{ijt} \end{aligned} \quad (1)$$

Where i indicates the exporter countries, j are the trading partners and t is the period under consideration, i.e. 1998-2010. EXP_{ijt} is real export flows between country i and country j , which is the nominal value of exports deflated by the unit value of exports index from IMF (IFS) following Longo and Sekkat (2004). Data on export flows are gathered from IMF Direction of Trade beside COMESA website. POP_i and POP_j are the populations at time t of country i and j respectively; gathered from World Bank' Development Indicator (WDI). GDP_i and GDP_j are gross domestic product of country i and j at time t ; INFR_i and INFR_j are infrastructure level measured by telephone lines per 100 people, gathered from WDI. INF_i and INF_j are inflation rates of exporter and importer, which are used to reflect the economic stability. The variable DIS_{ij} is the geographical distance in kilometers between the capital city of country i and of country j , collected from the following website: <http://www.distancefromto.net/countries.php>. CL is a dummy variable to capture common language, taking value of 1 if the two countries speak same language, and zero otherwise. Finally, μ_{ijt} is the error term. All the variables are expressed in the natural logarithms except dummy variables.

The expected sign for the coefficient of GDP per capita is positive, as an increase in national income stimulates more imports demand and exports supply between trading partners. The impact of population size (POP) is mixed as suggested by most of previous empirical studies. Markheim (1994) argues that a country with large population size entails a large domestic market and high degree of self-sufficiency and less need to trade (absorption effect). Other argument show that, a large population means more progress in specialization and division of labour and increase of the production, which are generally associated with a larger need for trading (scale effect). The impact of infrastructure variables is expected to be positive, as an improve in infrastructure would boost the bilateral trade between the countries. The effect of inflation would be negative, since instable economic situation reduces the size of trade. The coefficient of distance is expected to be negative, as the larger physical distance between two countries' economic centers, the higher is the cost of transporting goods between them. Finally, the dummy variable of common language is expected to be positive, as speaking same language indicate same cultures, and hence more trade between trading partners.

The gravity model in equation (1) is estimated via the panel data methods namely, fixed effects (FE) and random effects (RE) models. As our regression models involve individual effects, it is important to decide whether they are fixed or random; thus we focus on the fixed and random effects models. When estimating the trade flow between a randomly selected trading partners from a large population, a random effects is more appropriate, while fixed effects model is better when estimating the flow of trade between an ex ante predetermined selection of countries (Egger, 2006). Since our paper aims at identifying the determinants of bilateral trade between three predetermined countries (i.e. ESE); thus fixed effects would be appropriate than random effects model. However, the Hausman test statistic is applied to check further whether the fixed effects model is more appropriate than the random effects model. If the null hypothesis of no correlation between the individual effects and regressors is rejected, then fixed effects model is better than the random effects model.

The results of estimation of gravity model using fixed effects and random effects models are presented in Table 5. The results in the second column of Table 2 are those of the fixed effects models which consider the heterogeneity by estimating country specific effects. To support the efficiency of fixed effects, the F-test was performed to check the poolability of the data. The result of the F-test shows that the null hypothesis of equality of the individual effects is rejected, suggesting that a model with individual effects must be selected (i.e. fixed effects or random). Finally, the results in column three are those of the random effects model. To choose between the FE and the RE models, the Hausman test accepts the hypothesis that the coefficients of the FE models and the RE models are equal, suggesting that RE estimates are more appropriate and efficient. Thus, we rely on RE model of column 3, which takes into account all variables that specified in our gravity model. The Likelihood Ratio Chi-square of 295.93 with a p-value of 0.000 indicates that the selected explanatory variables of the random effect model together, have significant impact on bilateral trade flow between the countries under consideration.

The results show that all the estimated coefficients carry their expected signs and in line with the theory, except the GDP of trading partner. The coefficient of population variables of both exporter and importer country are positive and significant as expected, implying that an increase in population size encourages trade flow between them. This result confirms most of the previous empirical studies (e.g. Simwaka (2011) and Pastore et al. (2009)).

The GDP of trading partner is negative, while the impact of GDP of exporter is found to be positive and both are not significant. As expected the coefficient of infrastructure of trading partner is positive and significant. This indicates that an improvement of infrastructure in the importing country will boost the trade flow between trading partners. Specifically, an improvement in infrastructure of the importing country by 1% will lead to increase its exports from exporting country by about 25%.

The result also show that the coefficients of inflation of both exporter and importer are negative as expected, implying that economic instability in one country may reduce the volume of trade between its partners. In addition, the impact of geographical distance is negative and significant as expected, indicating that high transportation cost negatively affect the trade flow between trading partners. Finally, the impact of common language is found to be positive and significant, suggesting that neighboring countries that speak same language enjoy more trade activities between them. This result confirms the good trade performance between Sudan and Egypt, as both countries speak Arabic language.

Second, we analyze the potential gains from increasing trade between ESE countries based on the existing and expected trade patterns among these countries as well as their own current trade structure. Therefore, the analysis uses two approaches: exports diversification and product complementarity indices. These indices are used in literature to examine the trade potential between trading partners (see. Feenstra et al., 1999 and Chauvin and Gaulier, 2002).

4.2 Exports diversification

It is well recognized that countries with more diversified exports base are suitable candidates for a successful regional trade arrangement (RTA) (Chauvin and Gaulier, 2002). The reasons behind that are twofold. First, countries with more diversified exports are more likely to produce a greater range of products that can be exchanged with regional partners. Second, countries might become less vulnerable to exports instability that could lessen their commitment to regional arrangements. For example, Yeats (1998) noted that Sub-Saharan African countries exports' tend to be highly concentrated in a few products, many of which are not important in other African countries imports. That is, the potential of bilateral trade between low income countries is often low due to their similar structure that producing identical commodities like agricultural products.

To measure exports diversification we use a diversification index that employed by Feenstra et al (1999). This index is based on the composition of countries' goods exports. Non-tradable goods and services are left out of our estimation. While using the diversification of exports as a proxy of output diversification may have some limitations, it has the benefit of focusing on the link between trade and growth of exports. In addition, diversified exports of manufactured products, are supposed to enhance productivity through learning effects, opening up of investment opportunities such as, increasing supplying inputs, enhancing competition and technology transfer as well as improving of human capital (Chauvin and Gaulier, 2002). Therefore, the index of export diversification could be specified as follows:

$$DIV_t = 1 / \sum_{i=1}^n (x_{it}/X_t)^2$$

Where x_{it} is the exports of product i at time t , and X_t is the total exports at time t . This index increases with the degree of diversification. The results of export diversification indices for the three (i.e. ESE) countries are presented in Table 6.

The results of diversification indices in Table 6 show that Egypt is the most diversified country during the two periods. Ethiopia experienced a lowest diversification index over the two periods. The three countries have recorded an increased trend of their exports diversification. However, these low diversification indices reflect the features of a typical African country that is characterized by low trend of exports diversification (Chauvin and Gaulier, 2002).

4.3 Product complementarity index

Another method to assess the potential trade between ESE is the product complementarities. Following Chauvin and Gaulier (2002) the bilateral product complementarity index between two countries j and k (C_{jk}) could be defined as follows:

$$C_{jk} = 100 - \sum_i (|M_{ik} - X_{ij}| \div 2)$$

Where X_{ij} is the share of good i in the total exports of country j and M_{ik} represents the share of good i in the total imports of country k . This index is a measure of similarities between the export basket of one country and the import basket of another country (Chauvin and Gaulier, 2002). The value of the complementarity index can range from zero, which represents no complementarity between exports and imports of two countries, to one hundred, which implies a perfect match. The high index between two countries implies high product complementarity between them.

The bilateral product complementarities indices for Egypt, Sudan and Ethiopia are calculated using the data collected from UN-COMTRADE website. The results of calculation are presented in Tables 7.

The Table shows that the complementarity index between Egypt's exports and Ethiopia's imports has the highest value, with about 42.2%. This result implies that there is high scope for Egypt to export to Ethiopia, but not vice versa. In addition, the complementarities index between Egypt's exports and Sudan's imports is the second highest one, and this confirms the high rate of actual trade between them in the last two decades. This result also confirms the fact that Egypt is the most developed country among ESE and has comparative advantages in many products, particularly manufacturing. The results also show that the complementarities index for trade between Sudan and Ethiopia is far lower. Our results are in line with the studies of Chauvin and Gaulier (2002) and Yeats (1998), which found that African exports concentrated in few commodities, reducing their possibilities of intraregional trade.

5. Prospects and Challenges of forming Free Trade Area (FTA) between ESE Countries

5.1 Prospects for forming FTA between ESE

Based on the results of gravity model and diversification and complementarities indices in previous section, we evaluate the prospect for establishing a free trade area between Egypt, Sudan and Ethiopia (ESE, FTA). According to the literature on preferential trade arrangements (Custom union or FTA) are resulted in two gains for members: static and dynamic gains. The former resulting from the net effect of trade creation versus trade diversion, while dynamic benefits include increase competition, economies of scale, stimulus of investment and better utilization of economic resources.

Having the three countries endowed with a huge amount of diversified resources, a successful FTA can be launched to facilitate free trade. For example, Egypt possesses a considerable amount of relatively skilled human resources with huge saving, while Sudan possesses a huge amount of natural resources like agriculture, minerals and oil. On the other hand, Ethiopia endowed with a surplus of labor and natural resources like water and livestock. Thus, these diversified resources would be a potential base for comparative advantages in such countries, which facilitates the trilateral trade. In addition, product complementarities between the three countries are potential option for expansion of intra-regional trade. Thus, the potential benefits from forming FTA could be outlined as follows:

1. FTA increases market share of local production, as the ESE countries have abundant population in Africa. That is, the three countries host about 210 million inhabitants, consisting about 20% of African population. Therefore, population would be a potential factor for expansion trade between such countries.
2. FTA may create economies of scale in domestic production, as the three countries form a huge market since they are a big source of natural and human resources. This will foster economic growth and development.
3. FTA between ESE increases competition among members, which in turn improve efficiency and results in product quality and low prices.
4. Trade arrangement increases the intra-regional trade along with inflows of foreign capital (mainly Egypt) which can boost the industrial development in Sudan and Ethiopia.
5. FTA Increases investment and diversification of the exports, which would enhance economic growth and development of the countries.
6. In terms of opportunities presented by bilateral trade agreement between these countries, many opportunities can be gained from trade reforms and credibility for liberalization policies, as well trade-related governance and institutions.

5.2 Challenges of trade integration between ESE

Although establishment of FTA or any trade arrangement between ESE can provide fruitful benefits to the three countries, many factors may hinder the implementation of trade arrangement, which include:

1. Poor infrastructure in ESE impedes the free flow of exports and imports between the members. That is, these countries suffer from weak infrastructural systems in both physical and soft dimensions. However, Egypt has more advanced infrastructure compared to Ethiopia and Sudan. Recent statistics show that the ratio of paved road out of total roads in 2007 estimated at 83%, 42% and 14% in Egypt, Sudan and Ethiopia, respectively (World Bank, 2013). Moreover, Egypt is more advanced in soft infrastructure like Information and Communications Technologies (ICTs). Despite some efforts to establish road connectivity between the three countries, the existing roads have a little impact on trade between these countries. Notably, the weakness of roads system stimulates the informal trade between ESE.
2. Dependence on trade taxes is the common feature in ESE, which constitutes a major hurdle for tariff liberalization in the region. This is because revenue generated from custom taxes represents an important source of government revenue in these countries. Thus, removing tariffs impart a country from a significant financial source. This is because the proportion of trade taxes in total revenue and GDP in African countries is very high (Khandelwal, 2004).
3. Removing tariffs under the FTA can result in output and employment losses, as the removal of tariffs will have differential effects on economic sectors and firms in each country. Moreover, the FTA may lead to change in the sectoral and regional structure of individual economies that are likely to affect the overall level of tax revenues.
4. Commodity concentration is regarded as a critical obstacle for FTA between ESE; this is because the ESE are not well diversified economies and all countries are concentrated on few commodities like agriculture. This is what we have indicated from low indices of commodity complementarities.
5. Furthermore, the political tension between ESE countries is also of concern as it can slow down the pace of the integration process.

6. Concluding Remarks

This paper examined the trilateral trade performance between Egypt, Sudan and Ethiopia. In addition, the paper analyzes the prospects and challenges of forming regional trade arrangement between such countries. The paper used gravity model of bilateral trade as well as the diversification and product complementarities indices, employing annual data over the last two decades.

The results of gravity model show that the bilateral trade among ESE is influenced positively by GDP, population size, level of infrastructure of both exporter and importer countries. The rate of inflation and geographical distance are found to be negatively affecting bilateral trade between trading partners. These findings imply that economic performance play an important role in stimulating trade between ESE. The result also indicates that the coefficient of common language is positive and significant. The diversification indices show that Egypt is the most diversified country while Ethiopia experienced a lowest diversification index. The product complementarities indices also indicate that Egyptian' export enjoy high demand in other two countries. This result implies that Egypt has a potential opportunity to lead trade between Sudan and Ethiopia.

Moreover, the analysis revealed that ESE is qualified to implement trade arrangement such as, free trade area. The countries possess a diversified amount of natural and human resources, which could be a convenient base for product complementarities and comparative advantages

among these countries. These countries constitute a large part of the market in the regions, as they host about 20% of total population of Africa. Therefore, establishment of trade arrangement would foster the free flow of goods and services, promote growth, and reduce poverty in such countries. Despite the potential benefit of suggested trade arrangement, many challenges may hinder the implementation of such scheme, including poor infrastructure, dependence on trade taxes and political tension.

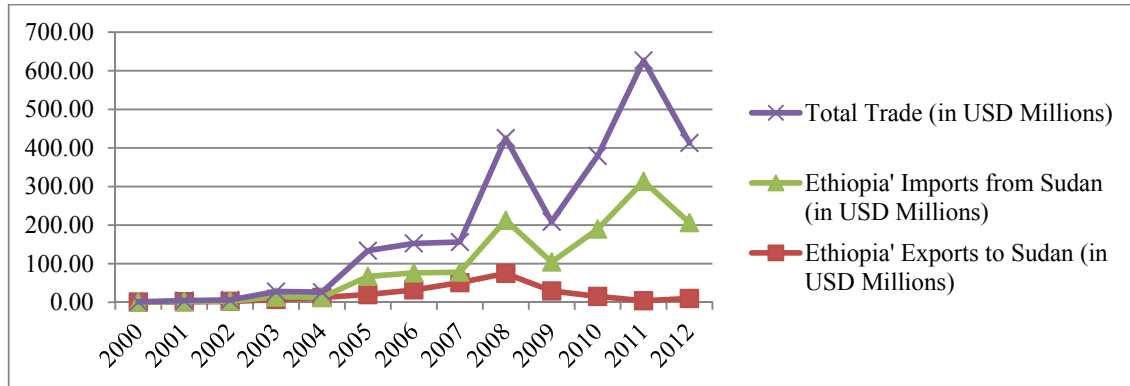
Based on the empirical analysis, the paper provides some recommendations for maximizing the prospects for trilateral trade between ESE, and reducing the trade challenges facing them. First and foremost, exports diversification should be at the top of policy agenda for ESE countries. Therefore, member countries need to give special attention to industrialization so as to enhance trade integration, since industrialization is the major reason behind the success of regional trade integration in the world. In addition, to raise product complementarities between the potential members, the specialization scheme needs to be adopted to break the good concentration. Moreover, increasing bilateral trade needs promotion of transport and communication infrastructure networks between the members. Furthermore, efforts should be devoted to attract foreign direct investment and private capital in order to promote the trade sectors. Furthermore, policy makers in ESE countries should adopt various policies to facilitate trilateral trade. These policies include, for example, flexible tax regimes, reducing transactions costs, preserving social peace and developing the human capital. Finally, policies that foster economic stability like reducing inflation rates via tightening fiscal and monetary policies should be adopted.

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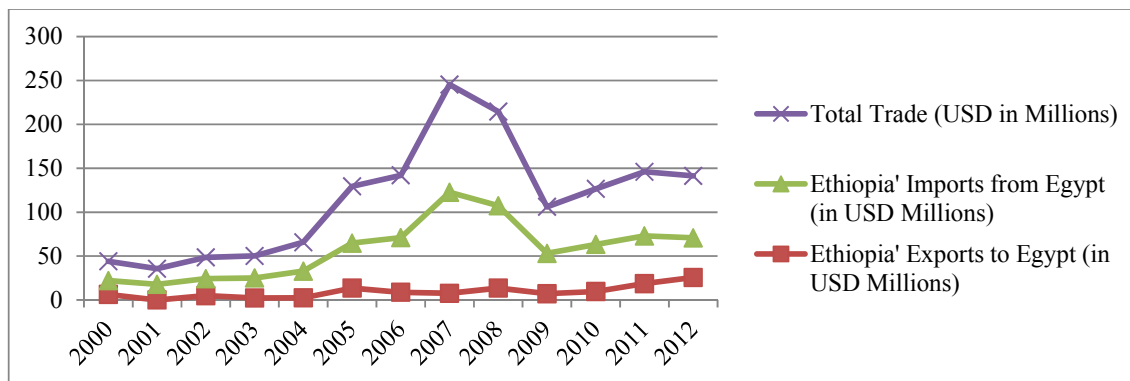
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Figure 1: Bilateral Trade between Ethiopia and Sudan



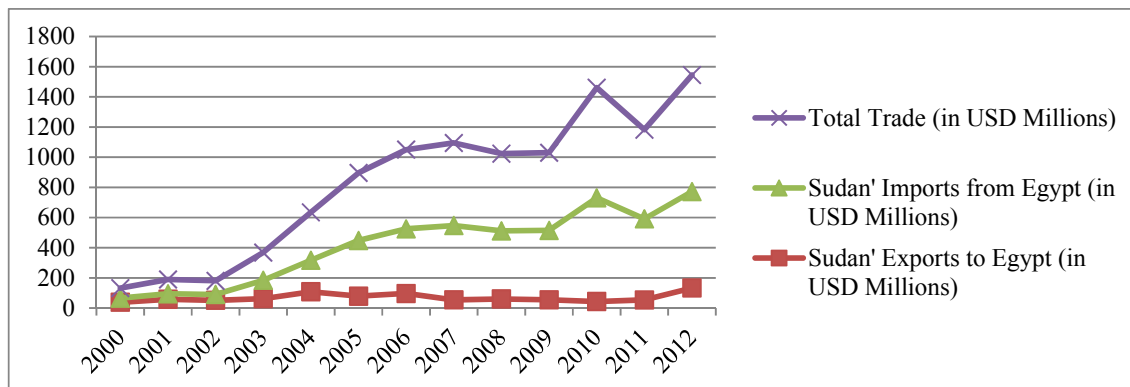
Source: International Monetary Fund, Direction of Trade Statistics (DOTS)

Figure 2: Bilateral Trade between Ethiopia and Egypt



Source: International Monetary Fund, Direction of Trade Statistics (DOTS)

Figure 3: Bilateral Trade between Sudan and Egypt



Source: International Monetary Fund, Direction of Trade Statistics (DOTS)

Table 1: Selected Economic Indicators-Egypt

Year	GDP Growth (%)	GDP per capita US\$	Population in Million	Agriculture/ GDP %	Industry/ GDP %	Services/ GDP %	Exports (Million US\$)	Imports (Million US\$)	Trade /GDP %
1980-1985	7.29	719.83	47.58	19.60	32.46	47.94	5926.67	10719.25	66.09
1986-1990	4.23	831.95	53.98	19.86	27.88	52.27	11242.36	11532.76	46.43
1991-1995	3.41	912.15	59.29	16.90	32.94	50.16	39208.66	14282.22	55.94
1996-2000	5.20	1061.71	64.11	17.08	31.55	51.37	49140.00	20596.53	42.00
2001-2005	3.53	1197.03	69.46	15.88	35.07	49.05	104700.00	22902.76	49.55
2006-2010	6.18	1440.27	75.51	13.81	37.43	48.76	244780.00	51838.84	60.46

Sources: World Bank's Development Indicators and IMF financial Statistics

Table 2: Selected Economic Indicators-Sudan

Year	GDP Growth (%)	GDP per capita US\$	Population in Million	Agriculture/ GDP	Industry/ GDP	Services/ GDP	Exports (Million US\$)	Imports (Million US\$)	Trade /GDP
1980-1985	0.95	462.65	15.75	34.02	15.14	50.83	850.93	1868.55	29.29
1986-1990	4.55	449.44	18.75	38.07	15.20	46.73	760.18	1421.81	13.38
1991-1995	5.13	473.82	22.71	39.57	11.67	48.76	482.30	1123.46	15.12
1996-2000	6.05	538.71	26.49	44.86	16.38	38.76	968.15	1608.66	23.41
2001-2005	6.41	627.41	29.99	37.83	23.02	39.15	3018.77	3825.42	34.60
2006-2010	6.26	766.97	34.03	26.87	28.76	44.36	10292.55	10515.72	41.76

Sources: World Bank's Development Indicators and IMF financial Statistics

Table 3: Selected Economic Indicators-Ethiopia

Year	GDP Growth (%)	GDP per capita US\$	Population in Million	Agriculture/ GDP	Industry/ GDP	Services/ GDP	Exports (Million US\$)	Imports (Million US\$)	Trade /GDP
1980-1985	-1.21	149.66	37.83	56.79	9.81	33.41	557.52	994.66	19.28
1986-1990	5.28	144.21	44.99	53.17	10.91	35.92	670.97	1186.23	17.32
1991-1995	1.33	121.54	53.37	61.25	8.19	30.56	522.15	1089.39	18.38
1996-2000	4.67	133.41	62.39	53.22	12.45	34.33	946.00	1690.69	32.98
2001-2005	6.61	144.42	72.03	43.75	13.70	42.55	1290.81	2779.51	43.00
2006-2010	10.89	201.78	82.66	47.56	11.50	40.94	3031.08	7877.49	45.37

Sources: World Bank's Development Indicators and IMF financial Statistics

Table 4: The Share of Egypt, Sudan and Ethiopia in COMESA Trade

Member State	Intra-COMESA Exports- in USD million		Intra-COMESA Imports- in USD million		Share in Total COMESA trade (%)	
	2000	2010	2000	2010	2000	2010
Egypt	113.79	2343.67	239.08	961.77	11.32	19.02
Ethiopia	155.14	287.30	107.58	286.24	8.43	3.30
Sudan	78.71	336.49	201.21	767.93	8.98	6.36
Total	347.64	2967.46	547.87	2015.94	28.73	28.68
COMESA	1696.5	9039.83	1419.35	8336.63	100.00	100.00

Source: Authors' own calculations based on data from World Bank Indicators and websites of COMESA (comstat.comesa.int/DataQuery.aspx).

Table 5: Estimation Results of the Determinants of Trilateral Trade between Egypt, Sudan and Ethiopia during (1995-2012)

Variable	The Dependent Variable is Real Exports	
	Fixed Effects	Random Effects
Constant	-9.430** (-2.40)	-7.138*** (-3.06)
LOG(GDPi)	0.726 (0.770)	0.728 (0.88)
LOG(POPi)	1.795 (0.430)	1.058*** (5.52)
LOG(GDPj)	-0.066 (-0.140)	-0.275 (-0.85)
LOG(POPj)	1.167* (1.58)	1.691* (1.79)
Log(INFRi)	0.218 (0.450)	0.142 (0.30)
Log(INFRj)	0.355* (1.92)	0.258** (2.53)
Log(INFi)	-0.102 (-0.540)	0.024 (0.17)
Log(INFj)	0.270* (1.64)	0.260* (1.68)
LOG(DISij)		-7.682*** (-3.38)
CL		4.564** (2.57)
R ²	0.61	0.78
F	17.81	
Hausman Test	2.10 (0.977)	
No of Observation	54	54
The likelihood ratio (Chi-square)		295.93 (0.000)

Note: *, **, *** indicate significance at 10, 5 and 1 per cent respectively. -t-statistics in parentheses.

Table 6: Diversification Indices for Egypt, Sudan and Ethiopia

Country	1995-2002	2003-2012
Egypt	8.6	11.3
Sudan	3.4	5.2
Ethiopia	2.6	2.9

Source: Author's calculation

Table 7: Bilateral Complementarities Indices between Ethiopia, Sudan and Egypt

Exporting Country	Egypt	Sudan	Ethiopia
Egypt	-	38.4	42.4
Sudan	19.4	-	22.5
Ethiopia	17.4	15.3	-

Source: Author's calculation