Determinants of Export in East Africa: Heterogeneous Panel Data Analysis

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Abstract Despite its vast agricultural potential, Africa’s balance of trade for at least three decades is in deficit, remained a net importer of agricultural products. Hence, it is worthy studying determinants of export in East Africa. This study employed world and Africa development indicator data for 37 years of 9 East African countries to study determinants of export. Descriptive result showed that Exports in East Africa remained low because domestic demand is high from high population of having low productivity. FDI is low. The pooled mean group estimation result shows that Real GDP of exporting and some importing countries, trade openness, labor supply, domestic demand and gross capital formation are variables which significantly affect export in East Africa in the short run. Similarly, Gross capital formation, Final consumption, foreign direct investment, real GDP of exporting countries, real GDP of importing countries and trade openness are variables that affect significantly export of East African countries in the long run. The study suggests that productivity of labor is too low and hence ways to improve is highly recommended. FDI though significantly affects Export both short run and long run is very low. Hence, ways to attract more FDI is highly recommended. Above all, Real GDP of both exporting and some importing countries significantly and positively affect export. Hence, both Supply side and demand side of export are equally important.

Keywords: export, East Africa, heterogeneous panel


1. Introduction

The significance of trade for growth and development has historically been built on classical theory that countries should specialize in producing and exporting commodities in which they have comparative advantage [1,2,3].

The share of global exports for Africa is lowest amongst the developing regions. The share of the region in global exports has been on a decline: from 7 per cent in the 1940s, through 5 per cent in the 1970s and 3 percent in the 1980s, and to 2 per cent at the end of 2016. In contrast, Asia’s share has been rising steadily, especially since the mid-1980s, from a low of 8 percent in 1970 and currently representing 36 percent of global merchandise exports [4]. However, a study by Alemayehu and others [5] shows that though China and India are displacing Africa’s export share, the entrance of Africa would not hurt it and the next comparative advantage will move to Africa.

The success story of developed countries in relation to export is attributable to different variables. Since the 1970s, the success stories of the Asian Tigers have made manufactured export-led growth to stand out as a reference developmental strategy, which are believed to include many advantages over agricultural exports. In china, it mostly relies on competition between domestic and foreign industries on provision of quality export [6] where as in Europe, though very sensitive to changes in relative prices [7], deeper trade integration within the EU, increased specialization, intensified by trade-liberalizing policies and decreasing transport costs, stimulated distribution of individual stages of production across countries intensified exports [8] and Higher share of high technology exports are major among many [9].

According to East Africa Economic Outlook [10], East Africa scored the highest economic growth compared to the rest region for almost decades. While supply side and foreign demand side of economic growth prompts export (Other things remain constant), domestic demand side of growth prevents it from its expansion. In East Africa, on the demand side, economic growth is as a result of expansion in consumption, especially in the fastest growing economies like Ethiopia, Kenya, Rwanda, and Tanzania.

On another hand, despite its vast agricultural potential, Africa’s Balance of trade for at least more than three decades is in deficit, remained a net importer of agricultural products in the last three decades. In 1980, Africa had an almost balanced agricultural trade when both agricultural exports and imports were at about USD 14 billion, but by 2007 its agricultural imports exceeded agricultural exports by about USD 22 billion [11].
Hence it is worth studying what factors causing persistent trade deficit in Africa in general and East Africa in particular. For this numerous studies have been undertaken. Of many, a study by Geda [3] on openness and inequality to see whether openness is tied to inequality or not; study by Alemayehu and others [5] to see whether income and distance affects export performance. Both study applied gravity model which is confined to income and distance alone.

There is also study on Export performance [12] that focused on selected East African countries using linear regression model. The study beyond its linearity assumption between export and variables there were important variables missed like trade openness, Domestic Demand and real GDP of importing countries. However, our study is different from this study not only by incorporating these missed and other variables but also in terms methodology. While these studies are confined to conventional fixed effect panel data our study was based on pooled mean group heterogeneous panel data. Hence, the general objective of the study is to analyze determinants of export using pooled mean group heterogeneous panel data. Specifically:

- To describe and analyze long run trends of export and see how it is related to its determinants
- To identify and analyze short run determinants of export in East Africa
- To identify and analyze long run determinants of export and see whether there is long run convergence of determinants of export

**2. Methods**

**2.1. Model Specification**

Export determination has been modeled differently for different purpose. Early model on export is gravity model. The gravity model has been widely used to study the determinants of bilateral trade flows among trading countries beginning with forerunner applied econometric work by Tinbergen (1962). Following gravity model there lots of literature on following his procedures [5,13,14]. However, it does not fully incorporate determinants export.

Later, export demand functions at the aggregate level, specified as a function of relative export Price and real GDP on export expansion. Hence, we expect positive impact of Real GDP on export expansion.

The re parameterized ARDL panel (p, q, q...q) after differencing lagged variables, error correction model is specified as:

\[
\Delta y_{it} = \theta_i \left[ y_{it-1} - \lambda_i X_{it} \right] + \sum_{j=1}^{p-1} \rho_{ij} \Delta y_{it-j} + \sum_{j=0}^{q-1} \beta_{ij} X_{it-j} + \gamma_i + \epsilon_{it}
\]

Where:
- \( \theta_i \) is \( (1-\delta_i) \) is group specific speed of adjustment coefficient
- \( \lambda_i \) is vector of long run relationship
- \( [y_{it-1} - \lambda_i X_{it}] \) is error correction term
- \( \rho_{ij} \), \( \beta_{ij} \) are the short run dynamic coefficients

Following the above model each independent variables are explained as follow with a prior expected sign.

**Independent variables**

1. Trade openness (LOGOFTOPEN): different literature use different concept measuring trade openness. For example Sachs and Andrew [18] have used tariff barriers more than 40%, average tariff more than more than 40%, black market exchange rate depreciated more than 20%, and socialists’ economy and state monopoly on major exports are indicators of closed economy. However, in this study we used the ratio of the sum of import and export to GDP as trade openness indices. The higher trade openness ratio, the more indication of trade openness the economy has.

2. Gross domestic production (LOGOFRGDP): From supply side gross domestic product the major determinants of export. This is because surplus of output can be exhausted in the international market if the economy is not closed (see for example [19,20]). Hence, we expect positive impact of Real GDP on export expansion.

3. Real Exchange rate (LOGREER): The relative price advantage of a country over its competitors is often captured by the real exchange rate. A fall in the relative domestic prices due to exchange rate depreciation makes exports cheaper in international markets resulting in increased demand for exports; therefore we expect the negative impact of real exchange rate on export growth.

4. Production growth: Growth of the GDP is a sign of future possible and persistence of production level. Growth is more binding determinant of exports as compare to GDP because it measures the sustainability of output levels. Hence, we expect positive impact of GDP growth on exports expansion.

5. Foreign direct Investment (LOGFDI): The role of FDI in exports promotion in empirical literature is debatable. Many studies find positive effect of FDI on exports [6,20]. Others have found insignificant [17]. There is study also that shows that the effect of FDI dependences up on the nature intensity of labor and capital [6]. Since government provides facilities for export promotion, such facilities also attract foreign investors. In order to promote exports
6. Domestic demand (LOGDDEM): Mirdala and others [8] have used domestic demand as the difference between GDP and net export for European countries. No Study, to the knowledge of the researcher at Africa level on determinants of export that incorporated domestic demand as one as one variable. Since balance of trade for African countries is negative, The difference between GDP and Net export is greater than GDP which does mean domestic demand is greater than GDP.

7. Foreign demand: Is variable that capture the need of importing countries. Major importing countries of East African countries are US, European Countries and Asian countries like, China. This variable can be captured by real GDP of importing countries from East African countries. Here we divided these countries in to two: North America (RGDPDMA) and European countries and Asians (LOGRGDPMEA) just instead of merging them together.

8. Labor supply (LOGLA): Labor force is an important factor to be included on determinant of export. According to theory of factor endowment, an industry should export goods which are produced using the relatively abundant resources of the home country. Majeed and Ahmed [17] in their work on the determinants of exports, using panel data ranging from 1970 to 2004 over 75 developing countries have used also labor force determinants of export.

9. Capital (LOGCAP): Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales. We include capital in the export equation believing that no activities could be done without capital.

10. Real GDP of importing countries (LOGGDPEU): The real GDP of importing country’s represents potential capacity for their imports given there is some demand in between. A high level of real GDP of importing country implies high imports. There fore we expect positive coefficient of real GDP of importing countries.

2.2. Data Type and Sources

The study used exclusively secondary data for all variables. It used heterogeneous dynamic panel data design. It has nine groups and 37 time series data for all variables. These groups are some selected East African countries. It is strongly balanced panel data.

The data for this study have been taken from World Development Indicators and African Development indicators (WDI) 2019. Only nine countries with available data were considered in the year from 1980 to 2017. Accordingly, Eritrea, Djibouti, Somalia and South Sudan were overlooked due to lack of data. For each variable expressed in terms of ratios to GDP, both the level of the variable and the GDP are measured in US dollar at current prices.

2.3. Method of Analysis

Secondary Data collected from World Development indicator and African Development indicator are inserted to Eview package. The study used both descriptive and inferential Analysis. The descriptive have use Xline, bar, histogram and son on mainly for trend analysis without any tests since it is not cross-sectional data. The inferential analysis used econometric analysis of dynamic panel regression using pooled mean group estimation of maximum likelihood method.

2.4. Estimation Method

2.4.1. Panel ARDL

ARDL model was selected in order to carry out regression equation set up in equation 3.1 and 3.2 this study. This was because ARDL technique could be applied regardless of whether the underlying variables are I(0) or I(1) or a combination of both. The unit root test for each variable indicates that all variables are stationary at most at I(1) except credit which is stationary at I(2). Since ARDL requires maximum of I(1), the variable was rejected. This was helped to avoid the pretesting problems associated with standard co-integration analysis which was required the classification of the variables into I(0) and I(1). Since each of the underlying variables stands as a single equation, endogeneity was less of a problem in the ARDL technique because it was free of residual correlation. The major advantage of this approach was laid in its identification of the cointegrating vectors where there are multiple co-integrating vectors.

2.5. Pooled Mean Group Model

The general Panel ARDL of equation 3.1 after differencing would have both error correction model and long run relationship. That is equation 3.2:

\[
\Delta y_{it} = \theta \left[ y_{i,t-1} - \lambda_1 X_{it} \right] + \sum_{j=1}^{p-1} \rho_j \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta_j' X_{i,t-j} + \gamma_i t + \epsilon_{it}
\]

By stacking on time series variable for each observation:

\[
\Delta y_t = \theta \left[ y_{i,t-1} - \lambda_1 X_{it} \right] + \sum_{j=1}^{p-1} \rho_j \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta_j' X_{i,t-j} + \gamma_i + \epsilon_{it}
\]

Equation 3.3 is the base for estimating panel ARDL using pooled mean group [21].

Their model is mainly for dynamic panel data models, where the number of time series observations, T, is relatively large and of the same order of magnitude as N, the number of groups. However, T is greater than N. Such
panels arise particularly in cross-country analyses. In most applications of this type, the parameters of interest are the long-run effects and the speed of adjustment to the long run.

Pooled mean group is the average between mean group method and dynamic fixed effect method. Mean group on, one extreme of panel, estimate separate equations for each group and examine the distribution of the estimated coefficients across group [22]. The other is, the traditional pooled estimators, such as the fixed and random effects estimators, where the intercepts are allowed to differ across groups while all other coefficients and error variances are constrained to be the same. Pooled mean group stands in mid of two. It allows the intercepts, short-run coefficients, and error variances to differ freely across groups, but constrains the long-run coefficients to be the same. There are often good reasons to expect the long-run equilibrium relationships between variables to be similar across groups, due to budget or solvency constraints, arbitrage conditions, or common technologies influencing all groups in a similar way.

**Assumptions required**

i. Disturbance $e_{it}$ is identically and independently distributed across i, t and $x_{it}$.

The assumption that they are independent across time is also not very restrictive because it can be satisfied in most applications by increasing the distributed lag and the independence of the disturbances and the regressors is needed for the consistent estimation of the short-run coefficients, but, as , it is relatively straightforward to allow for the possible dependence of $x_{it}$ on $e_{it}$ when estimating the long-run coefficients, as long as $x_{it}$ have finite-order autoregressive representations

ii. The ARDL(p,q,q,…q) in equation 3.1 is stationary which ensures that $\theta_i < 0$ and hence there exists a long-run relationship between $y_{it}$ and $x_{it}$.

iii. Long run homogeneity of group coefficient of regressors.

### 3. Results and Discussions

#### 3.1. Descriptive Result

**3.1.1. Export Trends, Growth and Its Ration to GDP in East Africa**

Figure 1 shows us exports of selected East African countries. Exports of East African country not only heavily rely on primary goods [5] but also exhibit very much low amount especially in earlier period of study under view. During first decades of study period under view (1980-1990), for all, it is low and seemingly stagnant in change. For example Kenya and Zimbabwe which held maximum export relative to others stayed between 2 billion and 2.1 billion (current USD) between 1980 and 1990. Ethiopia changed from 544 million to 596 million in the same range of years. Nonetheless, Kenya, Zimbabwe and Ethiopia seem better during this range in terms of volume of export.

However, for more than 75% of East African countries under view Exports are increasing after 2000s. Ethiopia, Kenya, Tanzania, Zimbabwe, Uganda, Madagascar and Mozambique are East African countries able to raise Export in this time. For instance, Kenya export changed from 2.7 billion USD in 2000 8.2 billion USD 2008. Similarly Tanzania export changed from 1.3 million USD to 5.5 million USD. In other words only Burundi and Rwanda were not able to raise the volume of export. Burundi’s export from changed from 125 million USD in 1985 to 152 million in 2005. However, of countries have been on increasing trend only Kenya able to have volume of export in 10 billion in a very recent year of study period under view, after 2010s. Though almost all have shown increasing trend of export during last decade, growth rate was not persistent, Figure 2, showing high fluctuation in growth rate. Virtually, almost for all, high growth rate is followed by negative or zero.

![Figure 1. Export (Merchandise and Manufacturing in USD) (Source: Own computation, 2020)](image-url)
During this range of years, for instance Ethiopia has negative growth during 2009 and 2013; Kenya during 2009, 2013 and 2017; Zimbabwe during 2008, 2014 and 2015; Uganda during 2009 and 2014; Madagascar during 2009 and 2012 and Mozambique during 2008 and 2015. Besides, high growth rate is also followed by negative in immediate years. For example if we take Ethiopia and Kenya: in Ethiopia having 23.6% growth in 2008, negative growth during 2009. In 2012 62% growth rate in export, but -3% growth rate in 2013. Similarly, in Kenya having 22.49 growth rates in 2008, negative growth rate in 2009. Similar pattern are seen for the rest countries also. This indicates that export in East Africa is highly fluctuating.

This persistence fluctuation is as a result of various factors. In Rwanda, Tanzania, and Uganda, which depend heavily on rained agriculture and primary commodities for exports, downside risks relate to the climate and global commodity prices. In Ethiopia, the vulnerability of rained Agriculture to vagaries of nature, heavy reliance on agricultural commodity exports, and weak export performance and the resulting foreign exchange crunch are key factors.

The problem of export in east Africa is not only stagnant growth in earlier and highly fluctuating in recent years but also the decline in the ratio of manufacturing to merchandise export for the last decades. Figure 3 shows this result. Of country under view during last decades only Ethiopia, Rwanda and Tanzania have the rise in manufacturing to merchandise export ratio. For these countries showing improvement itself the rate of growth is not significant. Over specified period for Ethiopia, Rwanda and Tanzania the ratio has increased from 7.3% to 10.3%; from 4.6% to 19.7%; from23% to 25% respectively. The remaining has shown the decline in the ratio over specified period except Mozambique which has the same ratio. This rise is from 31.31% to 12.19%; 4.6% to 19.7%; 23% to 25%; and 56% to 32% for Burundi, Rwanda, Zimbabwe, Uganda and Madagascar respectively. Madagascar though has shown decline in the ratio still represents country having the highest manufacturing to Merchandise export ratio.

**Figure 2.** Growth of export (Merchandise and Manufacturing in USD) (Source: Own computation, 2020)

**Figure 3.** Ratio of manufacturing to merchandise in USD) (Source: Own computation, 2020)
Figure 4. Export of goods and services to GDP (Source: Own computation, 2020)

Another issue that shall be seen is export and GDP (Figure 4). In East Africa within one third century the average export to GDP is 16%. It has never been greater than 50 percent. It extends from 2.5 % for Mozambique in 1986 to 43.4% for Zimbabwe in 1998. While Burundi, Ethiopia, Rwanda, Tanzania and Uganda have almost less than 20% export to GDP Kenya has greater than 20% on average during period under view. Zimbabwe and Mozambique have between 10% and 40%.

While Burundi, though low, has relatively stable export to GDP percentage, Kenya and Mozambique has relatively highly volatile ratio.

In general view, over a time, export to GDP in East Africa was low in the first decades of the period understudy. In between 1980s and 1990s it was the lowest for almost all. It was after 1990s that it started to rise.

Similarly, in the last decades (from 2007 to 2017) Rwanda, Mozambique and Madagascar have been on increasing export to GDP trend. It has been increased from 14.45% to 18.2%; 27.3% to 38.5%; 27% to 30% respectively. The remaining country, except Burundi which has relatively the same ratio, have shown declining pattern. For example, from 2007 to 2017 the ratio has decline from 12.7% to 7.6% in Ethiopia; from 21.9% to 13.2% in Kenya; from 19.8% to 15% in Tanzania; from 34.7% to 18.9% in Zimbabwe; from 19.8% to 15% in Tanzania.

Uganda and Rwanda have export pattern exhibiting a little bit U shape. While Rwanda has relatively stable export Uganda has increasing trend over time. But both have rising trend of GDP over time.

Lastly, Kenya and Zimbabwe entirely represents the higher export to GDP ratio relative to the rests. Before 1996 Kenya exceed both Sub Sahara Africa and East Asia and pacific whereas Zimbabwe exceed both on average. However, on average East Africa’s export to GDP ratio is lower than both Sub Sahara Africa and East Asia and pacific.

Figure 5. Annual GDP Growth (Source: Own computation, 2020)
3.1.2. Why is Export low over Time in East Africa?

The lower and constant percent of export to GDP ratio does not necessarily mean GDP is constant too. GDP of East Africa is on increasing trend entirely for all countries expect Burundi. For example, for the last decade under view (2007-2017) all except Burundi, Madagascar and Zimbabwe have no negative annual GDP growth (Figure 5). The minimum annual GDP growth from 2007-2017 (according to World Development Indicators data) for Ethiopia, Kenya, Rwanda, Tanzania, Uganda and Mozambique are respectively: 8%, 3%, 4%, 0.7% and 3% which has no negative growth rate. The remaining countries (Zimbabwe, Madagascar and Burundi) themselves have only few years of negative annual GDP growth. Burundi has during 2015 and 2016; Zimbabwe during 2007 and 2008 and Madagascar during only 2009.

However, the average annual GDP growth during period under view is positive for all countries. The minimum average annual GDP growth is 0.86 for Uganda while the maximum average annual GDP growth is 5.7 for Ethiopia for almost last four decades. While Ethiopia, Mozambique and Kenya are the first three top scorers, Uganda Madagascar and Burundi are the first three low scorer.

In fact export will not rise if the rise in production is totally absorbed by domestic demand. Figure 7 shows results of domestic demand. The likelihood of this event is high due to heavy reliance of export on primary goods of East African countries that at same time is also the source food for the citizen. In this way if we see domestic demand over the period under view it partially proofs this.

![Average Annual GDP Growth](image)

**Figure 6.** Average Annual GDP Growth (Source: Own computation, 2020)

![Domestic Demand](image)

**Figure 7.** Domestic Demand (Source: Own computation, 2020)
Ethiopia, Keya, Tanzania and Uganda have gradual increment in domestic demand whereas Burundi, Zimbabwe and Madagascar have relatively stable domestic demand. Rwanda has slight recent increment where has Mozambique has unstable domestic demand. However, Ethiopia has high rate of growth in domestic demand in recent years. For the last ten years domestic demand in Ethiopia has grown in between 5% and 16%; for Tanzania between 2% to 12% whereas for Kenya from 1% to 9%; for remaining it is less than these all ranges. This finding goes in line with report by East Africa economic outlook [10].

This, therefore, indicates that the rise in GDP is absorbed by domestic consumers especially for Ethiopia, Kenya and Tanzania where both GDP and domestic demand have risen. In fact, Madagascar is a country where domestic demand did not rise but, there is growth in GDP. But, Export to GDP ratio has increasingly been raised. This indicates that in Mozambique the rise in GDP was not absorbed by domestic demand.
Another question that ought to be answered is the relationship between domestic absorption and population growth for those the rise in GDP prevented from export due to domestic absorption. Figure 8 shows annual population growth. More specifically, for the country there is rise in GDP and Domestic demand, does the rise in domestic demand attributable to rise in population or consumption? To see this, it is worthwhile to compare population growth rate and domestic demand of these countries. For example, if we take Ethiopia, for the year over the last decade (2007-2017) population has grown by 2.7% and 2.8%. For Kenya annual population growth rate has decline from 2.7% to 2.3% whereas for Tanzania population has grown from 2.8% to 3% gradually without returning back.

Therefore, Ethiopia has shown the rise in GDP, domestic demand and population growth. This implies that the rise in domestic demand in Ethiopia is not emanating from the rise in consumption habit alone. This is because the rise in GDP and domestic demand was not with constant population or declining population growth rate Kenya having decreasing in population growth, but positive, has shown the rise in domestic demand and GDP and hence rises in consumption habit prevented export partly. For Tanzania, rise in domestic demand and GDP is intertwined with rise in population growth rate. Therefore, some of rise in GDP absorbed by the rise domestic demand due to population and hence not by consumption habit. Of all countries, the rise in population growth prevented the rise in GDP from export for the Tanzania than others.

Labor Force in East Africa during the first decades of study period has been constant for all. However, eventually it has grown for six countries: Ethiopia, Kenya, Tanzania, Uganda, Madagascar and Mozambique. Ethiopia has only high labor force growth rate but also has high labor supply from the inception while Burundi, Rwanda, Zimbabwe and Mozambique have both low labor supply and growth. For example, in 1980 labor force is 26.8 million which is the highest whereas for 2.7 million for Burundi which is the smallest. In 2017 labor force supply for Ethiopia is 49.8 million growing by 85.8 % in between which is the largest whereas for Burundi 4.6 million which the smallest, growing by 70%.

<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
<th>1980</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burundi</td>
<td>2.7</td>
<td>4.6</td>
</tr>
<tr>
<td>2</td>
<td>Ethiopia</td>
<td>26.8</td>
<td>49.8</td>
</tr>
<tr>
<td>3</td>
<td>Kenya</td>
<td>11.5</td>
<td>22.4</td>
</tr>
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<td>4</td>
<td>Rwanda</td>
<td>3.6</td>
<td>6.0</td>
</tr>
<tr>
<td>5</td>
<td>Tanzania</td>
<td>14.9</td>
<td>25.4</td>
</tr>
<tr>
<td>6</td>
<td>Zimbabwe</td>
<td>5.3</td>
<td>6.7</td>
</tr>
<tr>
<td>7</td>
<td>Uganda</td>
<td>7.8</td>
<td>15.2</td>
</tr>
<tr>
<td>8</td>
<td>Madagascar</td>
<td>6.8</td>
<td>13.0</td>
</tr>
<tr>
<td>9</td>
<td>Mozambique</td>
<td>5.3</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: Own computation, 2020.

Ethiopia, Kenya and Tanzania are country registering high GDP with rising labor force. But, none is able to make part of the rise in GDP for Export. In another way Rwanda and Uganda have increased GDP having stable growth of labor supply. Hence it is possible to say, other things remain constant, productivity of labor is increased for both countries. This rise in productivity of labor raised GDP and in turn increased export in Uganda.

Moreover, Zimbabwe and Mozambique having stable labor force growth able to have GDP growing slowly. While Zimbabwe was not fortune in expanding its export from the rise in GDP Mozambique was able to increase export from slowly growing GDP.

Burundi has low labor force and its growth, stagnant GDP, low domestic demand and low export. In Madagascar the slight rise labor force, with constant growth rate population did not lead to rise in domestic demand. On other hands, there was gradual rise in GDP. These two things induces rise in export. This rise in export is from manufacturing sector.

4.1.3. Trade openness, Foreign Direct Investment and Export in East Africa

I. Trade openness

Another key risk factor confronting East Africa is persistent current account deficits and related increases in external indebtedness. In Ethiopia, total debt is 60 percent of GDP (divided equally between domestic and external). Much of the external debt is owed to China and has expensive terms. A rising fiscal deficit and indebtedness are also risk factors for Kenya and led the government to pursue stringent fiscal consolidation [10].

Trade openness is the sum of exports and imports of goods and services measured as a share of gross domestic product. Burundi, Ethiopia, Rwanda, Tanzania, Madagascar and Uganda have export and import almost on average less than 50 % of GDP with in period of study whereas Kenya and Zimbabwe have more than 50%. Tanzania and Mozambique in earlier period have less than 50%; in recent period have more than 50%. Mozambique is country having high rate of growth of trade openness.

What makes these East countries similar is not only heavily dependency of export on primary goods but also trade deficit during the whole period under study. Since in earlier periods of study under view trade liberalization was not common, trade deficit was low in amount. In recent years even countries showing improvement in export like Ethiopia, Kenya and Tanzania never have a year positive net export. These countries instead of improvement in trade deficit encountered persistently rising trade deficit over a time. This is attributable to not only heavily reliance on primary goods whose price highly fluctuate but also heavy reliance of import for both capital goods and even consumer goods.

Moreover, East African countries rely not only on primary commodities but also on little number. For example during 2014-2017: coffee and tea comprises 48% of total export in Burundi, Coffee and Vegetables comprises 52% of export in Ethiopia, Coffee tea and flowers comprise 30% of export in Kenya; Minerals and Tobacco comprises 30% of Export in Tanzania; Mineral, Coffee and tea comprises 30% of export in Uganda.
II. Gross capital formation

In general view Gross capital formation of East Africa is not following on the same pattern. Burundi, Tanzania and Rwanda have same sort of U shape. Having high capital formation to GDP ratio during 1980s and 2010s they both scored relatively low during 1990s and 2000s. However, for Tanzania it skewed to high gross capital to GDP in recent years. Zimbabwe and Mozambique have followed decreasing trends in gross capital formation. Ethiopia, Uganda and Madagascar have shown increasing trend over a time though the rate of change seems different.
While Ethiopia is rising quickly Uganda’s change is gradual. Madagascar though raising its gross capital formation quickly before 2010 follows on decreasing pattern after it.

iii. Foreign Direct Investment

Foreign direct investment as percentage of GDP are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. East Africa especially in earlier period of study under view performed low in attracting foreign direct investment. For instance in between 1980 and 1995 for almost all East African Countries under study Foreign direct investment net inflow as percentage of GDP was less than 1%.

In entire period itself it is very much low. In fact Ethiopia is the first five top recipients of Foreign Direct investment in Africa next to Egypt, South Africa, Congo and Morocco. For Ethiopia itself the maximum FDI net inflow as percentage of GDP was 5% in 2003, 2004 and 2016.
The highest FDI inflow in East Africa occurred during 2013 for Mozambique which was 6.6 billion (Current USD) which was 40% of GDP. At the same year, the lowest is for Burundi which was 6.7 million (Current USD). In Mozambique Meanwhile, although the mining sector (particularly aluminum) contributes to the vast majority of export revenues and also concentrates most of FDI flows, it provides a very small share of GDP.

After 2005 Mozambique and Madagascar were able to attract FDI relatively in better way than the rests. However, in more recent years these two countries themselves showed declining pattern. Mozambique is an important destination country for FDI in South-East Africa. The country recorded historically high FDI inflows levels in 2013, reaching more than USD 6 billion, but they have decreased since then.

The evolution of FDI influx will depend on liquefied natural gas potential. Foreign investors are primarily interested in the country's mining, hydrocarbon, energy, logistics, retail and real estate sectors. There is a growing interest on the coal industry. In 2017, Mozambique's leading foreign investors were, in order, the United Arab Emirates, Mauritius, China, Italy, the United States, South Africa, Portugal and Turkey.

In addition to its abundant natural resources, the country's access to sea provides a significant advantage compared to its land-locked neighbors. The country has significant and varied natural resources (energy, mines, agriculture, forestry, and fishing) and its geographical location offers a serious advantage in the transportation field. The same is true for Uganda and Tanzania [23].

### 3.2. Econometric Results

#### 1. Testing for normality

One of the most important assumptions of estimation and hypothesis testing is the assumption of normal distribution of error terms with mean zero and constant variance which enables us to derive probability distribution of estimators. Moreover, it is assumed that variables are randomly selected from normally distributed population. This has to be tested now. Although non-normality of error term does not invalidate consistency and asymptotic normality (Verbeek, 2004), the above test is occasionally of interest. The most commonly used to test for normality is kurtosis/skewness test. However, Shapiro and Wilk (1965) are recently more commonly used to test for normality is kurtosis/skewness the above test is occasionally of interest. The most consistent and asymptotic non-normality of population. This has to be tested now. Although variables are randomly selected from normally distributed distribution of estimators. Moreover, it is assumed that number of cross-section units is large, while the time dimension is not, Pesaran [24] proposed a standardized version of the LM test. The scaled LM test is applicable for the panels under large time and cross-sectional settings. However, if the number of cross-section units is large, the null hypothesis for these tests is that no cross-sectional dependence exists in the data.

If the data set is composed of panel observations from a small number of cross-section units, then the Breusch and Pagan (1980) LM test can be taken as the best choice. On the other hand, for panel data sets with a large number of cross-section units, Pesaran [24] proposed a standardized version of the LM test. The scaled LM test is applicable for the panels under large time and cross-sectional settings. However, if the number of cross-section units is large, the null hypothesis is that the time series of all cross-section units, Pesaran [24] formulated the CD test. The CD test has good properties for the panels with both small cross-sections and time dimensions.

#### 2. Test for cross-sectional dependence/contemporaneous correlation

Cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years). This is not much of a problem in micro panels (few years and large number of cases). There are limited numbers of cross-sectional dependence tests that can be used for detecting the problem. These are the Breusch and Pagan (1980) LM test, Pesaran (2004) scaled LM test, Pesaran (2004) CD test, and Baltagi et al. (2012) bias-corrected scaled LM test. The general null hypothesis for these tests is that no cross-sectional dependence exists in the data.

If the data set is composed of panel observations from a small number of cross-section units, then the Breusch and Pagan (1980) LM test can be taken as the best choice. On the other hand, for panel data sets with a large number of cross-section units, Pesaran [24] proposed a standardized version of the LM test. The scaled LM test is applicable for the panels under large time and cross-sectional settings. However, if the number of cross-section units is large, the null hypothesis is that the time series of all cross-section units, Pesaran [24] formulated the CD test. The CD test has good properties for the panels with both small cross-sections and time dimensions.

#### Table 2. Test for Normality

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shapiro-Wilk</td>
<td>0.954202</td>
<td>5.79E-08</td>
</tr>
<tr>
<td>Shapiro-Francia</td>
<td>0.951939</td>
<td>2.05E-07</td>
</tr>
</tbody>
</table>

Accordingly, in this study we used scaled LM test. Hence, we fail to reject the null hypothesis of no cross-sectional dependence at even 10% level of significance.

#### 3. Panel unit test

Stationary of a stochastic process requires that the variances and autocovariances are finite and independent of time. A given series is weakly stationary if its expected value over time doesn’t depend on time. In this study Levin, Lin and Chu (LLC) [25] test is used to check the Stationarity of all variables in the model. The null hypothesis is that the time series of all individual regions have a unit root (non-stationary) against the alternative hypothesis of Stationarity. All variables included in the model that are strongly balanced are tested for unit root test. Accordingly, log of export to GDP, log of trade openness, log of real GDP, log of labor and log of domestic credit are found to non-stationary even at 10% level of significance. However, all are stationary at first difference. The remaining variables are stationary.
Table 4. Test for Unit root tests

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable</th>
<th>At level Statistic</th>
<th>At level Prob.</th>
<th>Stationarity</th>
<th>At first difference Statistic</th>
<th>Prob.</th>
<th>Stationarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Export to GDP</td>
<td>0.27722</td>
<td>0.6092</td>
<td>Not</td>
<td>-17.6151</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>2</td>
<td>Trade Openess</td>
<td>0.85969</td>
<td>0.8050</td>
<td>Not</td>
<td>-14.8918</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>3</td>
<td>RGDP</td>
<td>3.82750</td>
<td>0.9999</td>
<td>Not</td>
<td>-9.27221</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>4</td>
<td>Capital</td>
<td>-0.67381</td>
<td>0.2502</td>
<td>Not</td>
<td>-16.2975</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>5</td>
<td>labor</td>
<td>3.24261</td>
<td>0.9994</td>
<td>Not</td>
<td>-10.1519</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>6</td>
<td>FDI</td>
<td>-3.48945</td>
<td>0.0002</td>
<td>Yes</td>
<td>-9.86032</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>7</td>
<td>Domestic Demand</td>
<td>2.14616</td>
<td>0.9841</td>
<td>Not</td>
<td>-8.83766</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>8</td>
<td>Credit</td>
<td>6.45159</td>
<td>1.0000</td>
<td>Not</td>
<td>13.0470</td>
<td>1.0000</td>
<td>Not Stationary</td>
</tr>
<tr>
<td>9</td>
<td>RGDP North America</td>
<td>-4.54321</td>
<td>0.0000</td>
<td>Yes</td>
<td>-11.8497</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>10</td>
<td>Net Official Development Ass.</td>
<td>-1.78847</td>
<td>0.0368</td>
<td>Yes</td>
<td>-13.9004</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>11</td>
<td>RGDP east Asia and Pac.</td>
<td>-2.01998</td>
<td>0.0217</td>
<td>Yes</td>
<td>-12.7139</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>12</td>
<td>RGDP EU</td>
<td>-3.74029</td>
<td>0.0001</td>
<td>Yes</td>
<td>-11.9148</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>13</td>
<td>Real Exchange Rate</td>
<td>-0.11789</td>
<td>0.4531</td>
<td>Not</td>
<td>-11.0711</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>14</td>
<td>GDPgrowth</td>
<td>-6.24452</td>
<td>0.0000</td>
<td>Yes</td>
<td>-10.5538</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>15</td>
<td>GDP percap growth</td>
<td>-6.17083</td>
<td>0.0000</td>
<td>Yes</td>
<td>-8.81365</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
<tr>
<td>16</td>
<td>GDPEUA</td>
<td>-1.85253</td>
<td>0.0320</td>
<td>Yes</td>
<td>-10.5657</td>
<td>0.0000</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

The table above, Table 4, shows result of unit root test for all potential variables (all are in Log). Some variables are not included in the regression result but being tested here since this is primary test. The result for this unit root test shows that at level variables like foreign direct investment, real GDP of North America, net Foreign development assistance, real GDP of east Asian and pacific, GDP growth and its percapita growth of exporting counties and real GDP of European countries and Asia are stationary. The remaining variables are not stationary. Variables which are not stationary at level, when being seen at first difference are stationary except domestic credit which is stationary at the second level. Since one criteria of ARDL panel is Stationarity at level, first difference or combination this variable is dropped from the equation and hence provision of Stationarity at second level difference is not plausible.

4. Model selection criteria and optimal lags selection.

Economic theory does not provide any guidance to the appropriate choice of models; some additional criteria can be used to choose from alternative models that are acceptable from statistical point of view. What is the appropriate choice of lag in practice? This is a problem of model selection. One approach to model selection is to choose lag based on a Wald test. That is looking at the significance of additional lag to the model. Another widely used is to minimize the AIC or BIC information criterion. This study has used also AIC for model selection.

Though optimal lag length for both dependent and independent variable could manually be selected and tell it to eviews, here, it is also possible to select automatically. Accordingly, the software selected maximum lag one for both regressors and dependent variables using AIC. In fact when T is large enough the choice of lag is not important for robust [21].

Table 5. Model selection criteria

<table>
<thead>
<tr>
<th>Model</th>
<th>LogL</th>
<th>AIC*</th>
<th>BIC</th>
<th>HQ</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>411.586081</td>
<td>-2.076984</td>
<td>-0.857702</td>
<td>-1.589080</td>
<td>ARDL(1, 1, 1, 1, 1, 1, 1, 1, 1, 1)</td>
</tr>
</tbody>
</table>

3.2.1. Short Run Results

After analyzing numerous econometric tests that ought to be taken into consideration, results are presented in the Table 6.

The result of the study shows that out of variables incorporated 60% are significant at least at 10% of level of significance in the short run. Real GDP of exporting and some importing countries, trade openness, labor supply, domestic demand and gross capital formation are variables which significantly affect export in East Africa in the short run.

Trade openness positively and significantly, at 1% level of significance, affects export in east African countries. In fact, trade openness may take in different forms. It can be in the form of Average tariff, the extent of state control on major export and types of economic system. The degree of trade openness between China and US will not take similar measurement unit with any of East African
countries with China. In the former, it takes in the form of Average tariff where as for the latter it the matter of policy rather capacity. That is, for the latter even if trade openness is low (low export) it may not necessarily for policy. Besides, 1% rise in the ratio of import and export to GDP, export will rise by 0.68%. This indicates that export to GDP ratio in East Africa is inelastic to trade openness. However, it is positively affected by extent of openness. In fact since trade openness is the sum of import and export to GDP even if export is constant and import rises this variable implies as if trade openness lead to the increase in export.

The result also shows that real GDP of exporting countries is significant at 5% level of significance. It positively affects export. A 1% rise in Real GDP of East African countries will raise export to GDP by 1.07%. This together show that exports is elastic to real GDP of exporting country in East Africa in the short run itself.

Real GDP of importing country is also a variable significantly and positively affecting export of East African countries. 1% rise in real GDP of European and Asian countries will raise 1.17% export of East African countries. This is not surprising result, according to Africa trade report Asia remained the largest Africa’s export destination for over 1990 to 2019. European Union and North America follow Asia in export destination of East African Countries.

However, Real GDP of North American countries is not significant in affecting export of East African countries. This is because Africa’s export to US is mostly oil before rise of shale oil production on U.S. coasts which haven’t any relation to East Africa. Moreover, the steady deceleration in the United States’ share of Africa’s exports is a combination of other factors, including increasing Africa-South trade [26].

Another interesting result is significance of domestic demand in affecting export. It is significant at 10% level of significance in the short run. 1% rise in domestic demand of exported goods will reduce export by 0.75% in the short run. This result is not surprising result since most export of East African countries is primary goods which at the same time serve as sources for food domestic need. Therefore there is coincidence over export and sources for food.

Similarly capital formation is significant at 5% level of significance. However, it negatively affects export of East African countries in the short run. One percent rise capital formation will reduce export by 0.10%. One possible reason for negative relationship between export and capital is the level of infrastructure and issue of business climate. With the exception of Rwanda, Kenya (if you look at coefficient of capital in cross-section regression it is positive significant) and Ethiopia, these countries (East African countries) are also among the worst performers on the rankings of the overall quality of infrastructure (and their rankings are all below the Low income country’s average). Moreover, with exception of Rwanda East African countries are among the worst in on quality of the overall business climate. Specially, Ethiopia, Mozambique and Tanzania rank among the countries with the worst business climates. Besides, Mozambique, Tanzania and Uganda rank among the worst performing in terms of logistics.
Another more interesting result from short run pooled mean group estimation is the significance of error correction term and its negative sign coefficient. This implies that variables included in the model jointly have impact on the dependent variable. It also indicates that long run convergence to equilibrium since coefficient is negative. This coefficient is highly significant even for separate regression for each group.

However, real exchange rate, real GDP of north America, Foreign direct investment and household final consumptions are variables insignificant of affecting export of east African countries in the short run. This result goes in line with many studies. Though For Africa as a whole, the FDI stock is 29% of GDP, not far below the figure for the world as a whole, which is 33.6% [23], for East Africa it is very low. For Kenya itself the FDI net inflow for the whole period of study is less than 10%. In fact it is less than 10% for the whole country under the study except for Mozambique. Similarly real exchange rate is statistically insignificant in affecting export of East African countries. For example in Ethiopia, real exchange rate and FDI have no statistically significant effect on Ethiopia’s export performance [27].

Though access to markets for exports is also influenced by membership in trade agreements, which provide export opportunities through preferential access into certain markets, real GDP of country providing such opportunity is not found to be determinates of export in East Africa. For instance, AGOA permits tariff- and quota-free access for exports to the US from certain countries in SSA, providing them an advantage over competing exporters to US. However, real GDP of NA is not affecting export of East Africa. Furthermore, the role of trade agreements in facilitating diversification in manufacturing exports from Africa is not always clear. Studies show AGOA has not had a large impact on non-energy imports to the US from eligible countries. Between 2008 and 2013, crude petroleum accounted for 90%, on average, of US imports under AGOA [28].

### 3.2.2. Cointegration Test

A given time series is said to be stationary if mean and variance are constant irrespective of time. If non-stationary at level, we need to check Cointegration for stable, long-run relationship. Cointegration examine as if two series have constant co-variance over time. Panel data will follow also similar ways except for some averaging or combined statistics consideration.

Several tests have been proposed for panel Cointegration like Pedroni (1999; 2004), Kao (1999) and a Fisher-type test using an underlying Johansen methodology [9]. The Fisher test is a simply the combined Johansen test (as for the time series). The Pedroni and Kao tests are based on Engle-Granger (1987) two-step (residual-based) Cointegration tests. Pedroni proposes several tests for Cointegration that allow for heterogeneous intercepts and trend coefficients across cross-sections. Hence, Pedroni is not appropriate in pooled mean group since it assumes heterogeneity.

#### Table 7. Cointegration test

<table>
<thead>
<tr>
<th></th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual variance</td>
<td>-4.589011</td>
<td>0.0000</td>
</tr>
<tr>
<td>HAC variance</td>
<td>0.014158</td>
<td></td>
</tr>
<tr>
<td>Augmented Dickey-Fuller Test Equation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent Variable: D(RESID)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method: Least Squares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date: 08/25/20 Time: 16:55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample: 1980 2017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Included observations: 342</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic lag length selection based on SIC with a max lag of 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newey-West automatic bandwidth selection and Bartlett kernel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESID(-1)</td>
<td>-0.279924</td>
<td>0.039870</td>
<td>-7.021002</td>
<td>0.0000</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.141020</td>
<td></td>
<td></td>
<td>0.001467</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.141020</td>
<td></td>
<td></td>
<td>0.132160</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>0.122487</td>
<td></td>
<td></td>
<td>1.358303</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>4.500939</td>
<td></td>
<td></td>
<td>1.345987</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>205.4246</td>
<td></td>
<td></td>
<td>1.353374</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>2.172442</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 8. Long run pooled mean regression result

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGCAP</td>
<td>-0.359845</td>
<td>0.094225</td>
<td>-3.819006</td>
<td>0.0002</td>
</tr>
<tr>
<td>LOGEUA</td>
<td>0.543742</td>
<td>0.350128</td>
<td>1.552981</td>
<td>0.1219</td>
</tr>
<tr>
<td>LOGFC</td>
<td>-0.125210</td>
<td>0.073451</td>
<td>-1.704678</td>
<td>0.0897</td>
</tr>
<tr>
<td>LOGFDI</td>
<td>0.078522</td>
<td>0.017189</td>
<td>4.568140</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOGGDPCON</td>
<td>0.539629</td>
<td>0.114933</td>
<td>4.695165</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOGGDPNA</td>
<td>-0.895860</td>
<td>0.346601</td>
<td>-2.584705</td>
<td>0.0104</td>
</tr>
<tr>
<td>LOGLAB</td>
<td>0.064533</td>
<td>0.137890</td>
<td>0.468000</td>
<td>0.6402</td>
</tr>
<tr>
<td>LOGREER</td>
<td>-0.047046</td>
<td>0.028581</td>
<td>-1.646066</td>
<td>0.1012</td>
</tr>
<tr>
<td>LOGTOPEN</td>
<td>1.074942</td>
<td>0.113493</td>
<td>9.471464</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

#### 3.2.3. Long run Results

Though pooled mean group model of panel ARDL allows heterogeneity on group coefficient in the short run it restricts to homogeneous in the long run. The PMG estimator, which assumes homogeneous long-run coefficients, provides a useful intermediate alternative between estimating separate regressions, which allows all coefficients and error variances to differ across the groups, and conventional fixed-effects estimators, which assume that all slope and error variances are the same [21]. The long run result is given in Table 8.

Long run results of Panel ARDL regression show that most variables significantly affect export. Gross capital formation, Final consumption, foreign direct investment, real GDP of exporting countries, real GDP of importing countries and trade openness are variables that affect significantly export of East African countries in the long run.

In the long run trade openness is statistically significant in affecting export having 0% p-value which is less 1%. A 1% rise trade openness will rise export by 11.3% in the long run other things remain constant for East African countries. Foreign direct investment is also significant at less than one level of significance in the long run.

### 4. Conclusion

We start with describing and examining long run trends of different variables that could theoretically affect export. After describing long run trends simply using descriptive analysis, we preceded to estimation of aggregate export functions. From the estimated dynamic panel ARDL model, we calculate long-term and short-term coefficients and the coefficient of the speed of adjustment as well.

Exports of East African country not only heavily rely on primary goods but also exhibit very much low amount especially in earlier period of study under view. However, for more than 75% of East African countries under view Exports are increasing after 2000s.

The problem of export in east Africa is not only stagnant growth in earlier and highly fluctuating in recent years but also the decline in the ratio of manufacturing to merchandise export for the last decades.

The lower and constant percent of export to GDP ratio does not necessarily mean GDP is constant too. Ethiopia has shown the rise in GDP, domestic demand and population growth. This implies that the rise in domestic demand in Ethiopia is not emanating from the rise in consumption habit alone while Kenya having decreasing in population growth, but positive, has shown the rise in domestic demand and GDP and hence rises in consumption habit prevented export partly. For Tanzania, rise in domestic demand and GDP is intertwined with rise in population growth rate. Therefore, some of rise in GDP absorbed by the rise domestic demand due to population and hence not by consumption habit. Of all countries, the rise in population growth prevented the rise in GDP from export for the Tanzania than others.

What makes these East countries similar is not only heavily dependency of export on primary goods but also trade deficit during the whole period under study. In recent years even countries showing improvement in export like Ethiopia, Kenya and Tanzania never have a year positive net export. These countries instead of improvement in trade deficit encountered persistently rising trade deficit over a time.

East Africa especially in earlier period of study under view performed low in attracting foreign direct investment.

For instance in between 1980 and 1995 for almost all East...
African Countries under study Foreign direct investment net inflow as percentage of GDP was less than 1%

The result of the study shows that out of variables incorporated 60% are significant at least at 10% of level of significance in the short run. Real GDP of exporting and some importing countries, trade openness, labor supply, domestic demand and gross capital formation are variables which significantly affect export in East Africa in the short run. Trade openness positively and significantly, at 1% level of significance, affects export in east African countries.

The result also shows that real GDP of exporting countries is significant at 5% level of significance. It positively affects export. A one 1% rise in the real GDP, the ratio of import and export to GDP will rise by 0.68%. A 1% rise in Real GDP of East African countries will raise export to GDP by 1.07%. Real GDP of importing countries is also a variable significantly and positively affecting export of East African countries. 1% rise in real GDP of European and Asian countries will raise 0.59% export of East African countries.

Another interesting result is significance of domestic demand in affecting export. It is significant at 10% level of significance in the short run. 1% rise in domestic demand of exported goods will reduce export by 0.75% in the short run. Similarly capital formation is significant at 5% level of significance. However, it negatively affects export of East African countries in the short run. One percent rise capital will reduce export by 0.10%. However, real exchange rate, real GDP of north America, Foreign direct investment and household final consumptions are variables insignificant of affecting export of east African countries in the short run.

5. Recommendation

- Export in East Africa rely on few agricultural products with volatile growth rate, hence it would be imperative for diversification in export.
- Strong and significant relationship between export and real GDP of exporting countries imply that for export promotion enhancing economic growth is also one instrument.
- The positive and significant real GDP of East Asian and European countries imply that demand side of export is equally important to supply side.
- Most of countries with higher GDP growth are unable to export and fail to generate foreign currency only because of high domestic demand. Either rises in productivity of labor so that population growth would not be problem or have lower population growth.
- Labor though affects export both in the short run and long run has lower productivity, hence ways finding for enhancing productivity.
- Above all though FDI is highly significant in affecting export it is too low and lower than any region even for SSA. Hence, it would be better if East African countries employ different means for attracting FDI.
- Another problem for East African Countries is the lower ratio of manufacturing to total export, hence for sustainability framing FDI for export is also equally useful.

References

