The Effect of Foreign Direct Investment and Trade Openness on the Firms Export Competitiveness and Products Diversification among East African Community Members

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Contents

Abstract

This study examines the effect of Foreign Direct Investment (FDI) and trade openness on a firm's export competitiveness and diversification among East African Community (EAC) members. Unlike previous studies, we investigated this issue to emerging region of EAC. The study uses traditional panel methods of fixed and random effect for the sample period 2010–2019. On one front, the effect of FDI on a firm's export competitiveness and trade diversification were positive and statistically significant. On the other front, the effect of trade openness was positive and statistically significant only to export diversification but insignificant to export competitiveness. All results are robust to the alternative dependent variable, control variable, and sample size. Policy reforms to improve economic freedom, technological development, and strengthening the inter-relationship of the domestic sector with FDI and trade openness are required to improve export competitiveness and diversification.

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1.0 Introduction

1.1 An overview of the Study

The rise in globalization over the past 30 years has resulted in rapid changes and mobility of technologies and internationalization of production of goods and services through Foreign Direct Investment (FDI) and trade. The reasons for this shift have to do mainly with the inefficiencies of import substitution and the success of exporting in promoting economic growth (Greenaway et al., 2005). In line with these trends, Africa has witnessed a surge in FDI in recent years. For instance, FDI increased from US$5 billion in 1995 to US$48 billion in 2015 United Nations Conference on Trade and Development (UNCTAD, 2016). At the same time, the rise in globalization has exposed many African countries to the pressures of international trade competition.

FDI introduce new products or processes in the host country, technology diffuses to the domestic firms which are competitors in production or suppliers of inputs to the foreign companies (see, for example, Aitken et al, 1999; Kathuria, 2000). It acts as a channel for technology spills overs effect through transnational corporations. Also, increase productivity and competitiveness among the domestic manufacturing firms. Though, appropriation of these benefits is subjected to the level of absorptive capacity of the firms, available human capital in the country and competitive environment of the industry.

Also, globalization through trade openness is thought to improve firms' efficiency through three major channels. First, allows the exploitation of economies of scale that raises productivity. Second, globalization through trade fosters a learning process through knowledge spillovers and new technology adoption (Clerides et al., 1998; Baldwin and Gu, 2003). Third, export intensity improves management efficiency due to competition abroad. Trade in manufactures along with export-led industrialization that seems like the last best idea for using trade to speed up development in the modern era. Indeed, Sustainable Development Goals (SDGs) encourage

and promote sustainable industrialization specifically promoting reflecting its importance in advancing sustainable development.

The recent literature on trade highlights the importance of the composition and structure of exports in driving economic growth. (Hausmann*et al*., 2007). Hausmann*et al.* (2007) showed that countries that produce higher productivity goods and export sophisticated or 'high-tech' goods are more competitive in international markets, and they grow faster. Notwithstanding these observations, Africa's share of global exports of high technology products remains low. For instance, while developing countries accounted for 52% of global exports of high technology products in 2014, African countries accounted for only 0.3% (UNCTAD, 2015). Thus, African policymakers are confronted with the challenge of igniting export growth and enhancing export competitiveness.

Export competitiveness is important in Africa for several reasons. First, a large strand of the literature, especially on export-led growth hypothesis, suggests that exports are the main determinants of a country's Gross Domestic Product (GDP) growth (Anwar and Nguyen, 2011; Eryigit, 2012). As such, African countries need to diversify their export sectors and improve competitiveness of their exports to sustain their growth rates. Second, export diversification and increased high technology exports play an important role in reducing the vulnerability of exports to external shocks and thus help reduce the volatility of economic growth. Third, a stronger export sector helps to drive job creation, especially in the manufacturing sector. Fourth, at a microeconomic level, many arguments in favour of export-market participation have been put forward. Lastly, growth in export of sophisticated products is key to reducing external imbalances, and macroeconomic stability, without creating debt, given the wide current account deficits of most African countries.

In this view, African economies require policies that invigorate export competitiveness to steer economic growth. Meanwhile, developing countries, faced with insufficient domestic savings, have over the years emphasized attracting FDI as a way of bridging the gap between insufficient

savings and desired investment. This has raised the question of whether FDI could play a role in enhancing export competitiveness in Africa.

East Africa's economic structure and growth patterns are characterized by low industrialization. The manufacturing value added grew by just 1.7 percent over 2000–16, which was less than GDP growth, reducing the manufacturing sector's share in GDP. (AfDB, 2019). Average manufacturing value added in GDP was just 8.1 percent, far below the Sub-Saharan Africa (SSA) average of 10.3 percent in 2016. The average share of manufactured exports in total merchandise trade, 14.6 percent, also shows the region's lack of structural transformation.

The contribution of manufacturing sector to GDP among EAC is still below 8 percent for all EAC members except for Uganda which has 15.5 percent during 2018 (EAC, 2019). The level of competitiveness of EAC members in manufactures, in general, has been declining among EAC members[1]. The employment to manufacturing sector is still low compared to other African middle-income economies. For example, in Kenya the employment increased from 269,000 to 281,000, while in Tanzania increased to 221, 108 up from 139,895 (EAC, 2019).

In this view, African economies require policies that invigorate export competitiveness to steer economic growth through attracting FDI as a way of bridging the gap between insufficient savings and desired investment. Despite the strong growth of FDI and international trade in Africa, little attention has been paid to the potential role of FDI in promoting export competitiveness. This study is differing from previous literatures by using microeconomic data of industrial sector among 5- EAC members.

This chapter has two main objectives, firstly to examine the effect of FDI inflows and trade openness to the firm's competitiveness. Secondly to examine the impact of FDI and trade openness on firm's market diversification. The importance of this study is to understand the relationship between FDI and exports specially to manufacturing sectors which confined to

[1]https://www.tralac.org/news/article/8618-eastern-africa-s-manufacturing-sector-promoting-technology-innovation-productivity-and-linkages.html

other countries but not in East African and SSA region. For example, the governments of the East African community have adopted the export-led growth and developed industrial policy vision from 2012-2032 entitled “structural transformation of the manufacturing sector through high value addition and product diversification based on comparative and competitive advantages of the region”.

Contribution to the literature is in two ways. First, it evaluates the role of FDI on export competitiveness in SSA using panel data method which is uncommon to previous studies. Also, the study is expected to use a comprehensive measure of export competitiveness such as the *Expy* which has been found to be a strong and robust predictor of economic growth in many countries. Also, the study will use other indicators. To gain more insight, other proxy such as the RCA is used as alternative measures of export competitiveness.

This chapter is presented into six main sections. Next section explains the performance of EAC Members in FDI, Trade and Manufacturing Sector in different region with EAC partner states. The third section explains the theoretical and empirical literatures while section four discusses the methodology of the study. The fifth section presents an analysis and discussion of the results while the final section provides conclusion and policy recommendations.

1.2 Industrial competitiveness in EAC members

The EAC community was formed by three East African countries including Kenya, Uganda and Tanzania. EAC was existed between 1967 and 1977 where it was followed by East African co-operation from 1993 to 2000. The collapse of EAC in 1977, led to negotiation to have division of assets and liabilities in 1984. The EAC members formed new economic integration on 30 November in 1999. On 1 July 2005, Republic of Rwanda and Burundi became the new members of EAC. This made a total number of EAC members to be five including Rwanda and Burundi. The main aims of establishing EAC were to widen and deepen economic, social, political co-operations for the benefit of member countries.

Recently, there has been an emphasis on industrial development in past and contemporary development plans for many low- and middle-income countries, specific the development of the manufacturing sector. In acknowledgement of the need to develop industry and to stimulate economic development, the EAC developed an industrialization strategy for 2012 to 2032.

Ambitious targets were set drawing from the EAC Industrialization Policy including: diversification of the manufacturing base, increase in local value-added in resource-based exports to at least 40% by 2032, expansion of manufacturing exports as a share of total exports to 60% and intra-regional manufacturing exports relative to total manufactured exports to at least 25% by 2032 and strengthening of research and development and technological capabilities towards transformation of the sector through industrial upgrading. Expected long-term outcomes include MVA contributing to 25 % of GDP and MVA per capita reaching 258 USD by 2032 (EAC, 2010).

1.3 Trade Openness in different regions compared to the EAC region

For the five years (2010-2014) the total EAC exports to the rest of the world declined rapidly from 3.8 billion to 2.9 billion which is equivalent to drop from 33 percent to 18 percent. (See table 2.1). The declines in exports resulted from fallings in the price of exported goods and demand from EAC resulting from the unfavourable global economic environment. From 2015 to 2019, the EAC's total export to the rest increased marginally from 35 % (6.0 US$) to 41.1 % (6.4 US$).

Table 2. 1: Trend of Merchandise Trade in World Regions Compared to EAC Region

Destination /Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total EAC Exports	11,819.76	14,274.02	16,046.00	14,971.30	16,109.14	16,819.6	13,877.2	14,143.5	14,213.8	15,760.8
Intra-EAC Total Exports	2,237.75	2,564.12	3,154.96	3,698.56	3,230.41	2,823.0	2,631.4	2,977.4	3,170.5	3,162.8
COMESA	1,610.13	1,901.52	2,055.91	1,801.10	2,763.15	2,335.5	2,579.3	2,624.8	2,523.0	1,538.2
SADC	1,319.04	1,789.96	2,329.92	2,127.17	3,067.11	1,496.5	1,843.4	2,105.7	2,192.1	2,193.3
Rest of Africa	220.08	265.39	293.21	433.80	787.48	606.0	799.6	328.5	268.9	260.6
EU	2,193.58	2,520.97	2,512.99	2,183.75	2,663.57	2,398.8	2,347.9	2,378.0	2,450.7	2,280.9
USA	362.56	385.56	411.83	449.47	651.17	521.9	667.4	751.2	600.1	623.6
Total Exports to Rest of the World	3,876.62	4,846.50	5,287.18	4,274.45	2,946.35	6,054.1	5,932.1	5,394.9	5,282.8	6,479.5

Source: Author's calculations from EAC reports 2015-2019.

The increment in total export in the EAC was attributed to increasing export volumes for agricultural products like cut flowers, coffee, tea and tobacco, due to improved weather conditions over the last two years, coupled with an increase in prices of commodities like gold and fish, supported with increasing demand, especially from China and the Far East. When viewing other economic blocks, EAC leading in exporting merchandise with the members' state compared to other economic regions as shown in table 2.1.

1.4 Trend of FDI inflows among EAC

The FDI inflows to East Africa Community increased from US$ 3,805.96 billion posted in 2010 to $ 3,845.56 billion in 2014[2] (Table 2.2). This was largely driven by the significant growth of FDI into Kenya and the United Republic of Tanzania. Generally, for the period between 2010 and 2014 on average, FDI inflows increased by 19.312%. (Table 2.2).

[2] See, Word Investment report (2015)

Table 2.2 FDI Inflows to EAC Region, 2010-2014 (US$ million and % growth)

Country	2010	2011	2012	2013	2014	Percentage Growth 2010/2014
Burundi	0.78	3.36	0.60	7.41	47.06	5928.97
Kenya	1,197.55	1,450.47	1,380.20	1,118.83	820.94	-31.45
Rwanda	250.50	1,19.11	254.96	257.60	458.90	83.19
Uganda	543.87	894.29	1,205.39	1,096.00	1,058.57	94.63
Tanzania	1,813.25	1,229.38	1,799.60	2,087.30	1,416.10	-21.90
Total	3,805.96	3,696.61	4,801.75	3,774.13	3,845.56	1.04
Av. Growth	11.792%	-2.87%	29.90%	-21.40%	1.89%	19.312%

Source: Author's calculations from UNCTAD 2010-2014.

For the period 2015-2019, also FDI inflows into East Africa Community members state dropped by 19.61 as it decreased from US$ 33.0 million to US$ 4149.97 million (Table 2.3). China was the largest investor in 2019, accounting for 59.7 percent of FDI inflows to the region, with significant investments in construction, manufacturing and services. (EAC, 2019). There was a disappointing decline in FDI inflows during 2015, 2016 and 2019.

Table 2. 3 FDI Inflows to EAC Region, 2015-2019 (US$ million and % growth)

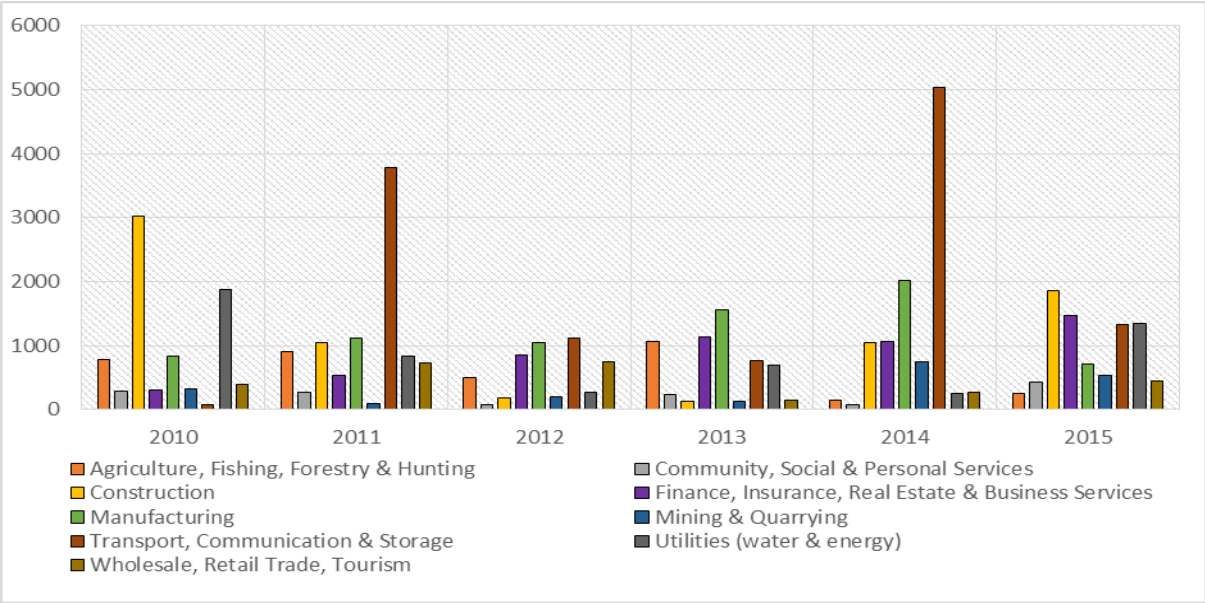
Country	2015	2016	2017	2018	2019	% Growth 2015/2019
Burundi	7.36	0.06	0.32	0.98	1.04	-85.80
Kenya	619.72	678.80	1266.13	1625.92	1332.44	115.00
Rwanda	379.80	342.30	356.44	381.91	420.16	10.63
Uganda	737.65	625.70	802.64	1055.35	1266.03	71.63
South Sudan	1560.80	864.00	937.70	1056.00	1112.40	-28.73
Tanzania	0.15	-7.85	1.42	60.14	17.90	11835.56
Total EAC	3305.48	2503.01	3364.65	4180.30	4149.97	25.55
Av. Growth	-14.04%	-24.28%	34.42%	24.24%	-0.73%	19.61%

Source: Author's calculations from UNCTAD online data base, 2015-2019.

1.5 Sectorial Distribution of Foreign Direct Investment inflow to EAC

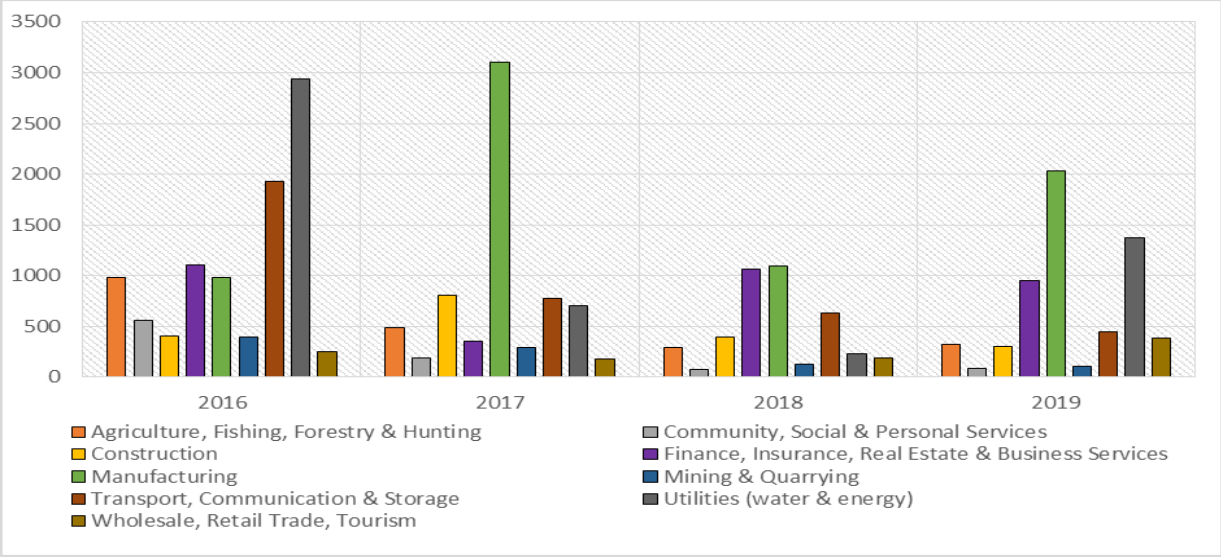
Generally, during 2010-2015 FDI inflows by sector was mainly concentrated in transport, communication and storage sectors which followed closely by the construction and manufacturing sector. (Figure 2.1 and 2.2)

Figure 2. 1 Sectoral distribution of FDI inflows to East African community member's states



Source: Author's calculations from EAC report 2010-2015

Figure 2. 2 Sectoral distributions of FDI inflows to East African community member's states



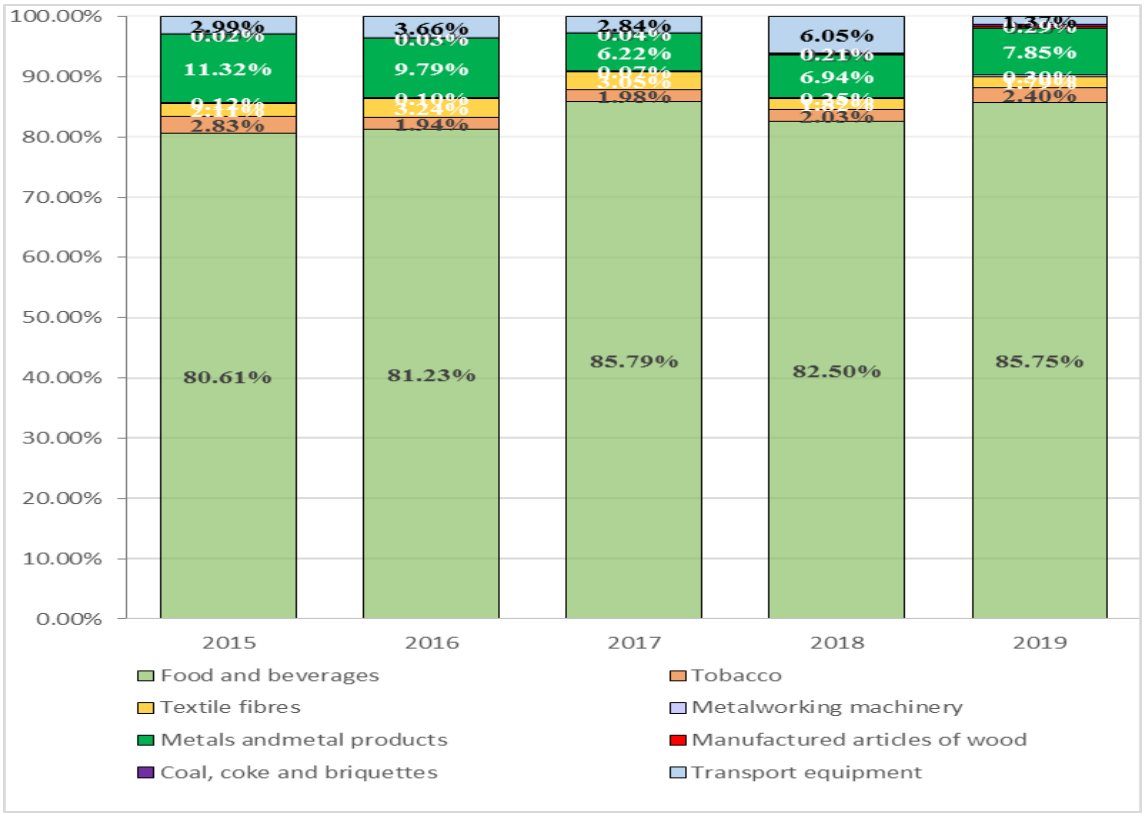
Source: Author's calculations from EAC report 2015-2019

FDI in manufacturing sector becomes prominent during 2016-2019 compared to the period of 2010-2015.Overall, FDI inflows to the EAC were concentrated in manufacturing, construction and services sectors. China was the largest investor in 2019, accounting for 59.7 percent of FDI inflows to the region, with significant investments in construction, manufacturing and services.

1.6 Firms export product diversification

Diversification of a country's productive and export structure is an important characteristic of industrial competitiveness and economic development in general. There is a positive relationship between industrial diversification and country income levels, especially at lower stages of economic development (see, Imbs and Wacziarg, 2003). Diversification is more important for economies such as those of the EAC, which are resource-based economies, engaged mainly in the production and exportation of primary goods.

Figure 2. 3 EAC manufactured exports by sector (2014-2019)



Source: COMTRADE online data base 2021 and authors' compilation

For example, in figure 2.3 there is a mixed performance of EAC partner States in export product diversification, Kenya, followed by Uganda and Tanzania, display a level of concentration of their respective top five manufactured exports which are below the average of the sample. Kenya at least plays a better role in this regard, as its top five products contribute to only 22% of manufactured exports.

2.1 Theoretical literature reviews

2.1.1 Export Competitiveness

The term export competitiveness can be defined as the ability of a country to produce and sell goods in best qualities as required by foreign buyers, and at convenience which is better than or equal to those of other potential foreign suppliers[3]. (Sharples and Milham, 1990). Lotfi and Karim (2016) claimed that export competitiveness is the ability of countries to successfully integrate into the global economy. FDI can affect export competitiveness through either enhancing productivity or efficiency. The efficiency and productivity can be enhanced through technology and knowledge spillovers over effect and introduction of new export products and facilitating access to new and large foreign markets.

2.1.2 Relationship among FDI, trade openness and export competitiveness.

Ricardo (1817), in his classical trade theory, argues that a country has a comparative advantage in trade if it can produce a good at a lower relative cost than its trade partners. He insisted on relative differences in labour productivity are the basis of differences in production costs. This implies that export competitiveness is determined with price competitiveness, comparative cost advantages, factor endowments and relative labour productivity and cost differentials across nations. The Heckscher–Ohlin model extended Ricardo theory, by arguing that, cost differentials are determined by differences in relative factor endowments. Unlike early

[3]According to this definition, export competitiveness encompasses both quantitative and qualitative factors such as quality of exports, capacity for technological innovation, and degree of product specialization. However, these factors are difficult to measure in quantitative terms.

theories, proponents of the neo-technology trade theory emphasized the role of innovation in conferring cost advantages on the innovating nation.

Romer (1990) suggested that a new model which indicates that productivity growth is driven largely by technological change that arises from intentional investment decisions made by profit-maximizing agents. According to Romer, the technology is labour augmenting, and enhance the research and development capital accumulation. Building on Romer's model, Grossman and Helpman (1985) showed that the interaction between innovation in the industrialized and low-income countries and the processes of research and development. They also insisted that, economic development is one prerequisite for firms to continuously upgrade their production to produce more advanced products.

Borensztein et al. (1998) argued that in order to have higher productivity of FDI in a host country must have a minimum threshold stock of human capital to absorb the advanced technologies. FDI helps to accelerate human capital development through Multinational Enterprises (MNEs) when they bring along technical assistance, training of workers, and increase experience through interaction and managerial capacity building. The local firms can benefit from technological diffusion through the transmission of ideas and adapt new technologies. This can be transmitted through either vertical or horizontal spillovers, at the country, sector (industry), or firm level.

The firms' gains through vertical spillovers through the interaction with foreign firm's up-or down-stream in the production chain. These can be backward spillovers (e.g., a foreign firm intentionally assists local sub-suppliers to deliver high-quality inputs and shares with them superior technology) or forward spillovers (e.g., higher quality inputs produced by foreign firms used in the production chain by the local firms). (Gamariel and Hove, 2019).

Export competitiveness can also be enhanced by improving access to world markets for local exporters. The local firms can increase access to markets increases output, lowers prices, raises profitability. The local firms can increase export distribution networks and the information to

access foreign markets, as a results, FDI establish a strong niche for domestic firms to export (Markusen and Venables, 1999).

However, if FDI is only concentrated on target tradable sectors, they may result to Dutch diseases effects. This happens when the large capital inflows may influence appreciation of the real exchange rate in turn discourage competitiveness of manufacturing sectors (Sachs and Warner, 1997; Botta et al., 2015). Also, FDI through Dutch disease may also distort the balance of payments position of the host economy. The profits from FDI can be repatriated back to foreign investors, distorting the capital account and worsening the balance of payments.

FDI inflows in some African countries is also affected by nationalist ideas from local citizens over an increment of foreign business ownership and control of the economy and their also political influences to host country (Moss et al., 2004). Meanwhile, it is not surprising to evidence restrictions through nationalizations, expropriations, ownership, rate of return, project approval requirements financial restrictions as well as trade.

2.2 Empirical Literatures

2.2.1 Direct impact of FDI and trade openness on firm's export competitiveness.

Blomström and Kokko (1996) they contend that FDI improves the productivity and competitiveness of manufacturing firms, as local firms enter strategic alliances with leading foreign MNEs to expand their technology bases. Moran (1998) suggested that FDI increased competitiveness and efficiency in the Mexican automobile export industry. Similarly, Prasanna (2010) found that FDI inflows in India led to significant increases in total and high technology-manufactured exports.

Using firm-level data, Liu (2008) and Zhang (2006) claimed that FDI play a positive role on China's export performance and its effects are much larger than that of domestic capital. In addition to that, Zhang (2015) using industrial competitiveness in a large panel data set of 21

manufacturing sectors for 31 regions, they claimed a positive and significant effect of FDI on China's low-tech manufacturing than on medium and high-tech industries, which are proxies for export competitiveness. Also, Greenaway *et al*. (2004) analyzed UK firm-level data to confirm that FDI significantly increases the exporting competitiveness to domestically owned firms.

Yan chen *et al.* (2012) examined the effects of outward foreign direct investment (O-FDI) on the export competitiveness of home-country in China. They used manufacturing data for 15 industries with sample size between 1991 and 2007. The authors suggested that exports in Taiwan are positively associated with O-FDI by Taiwanese firms. However, FDI inflows were positive but insignificant. They argued that foreign-invested firms in Taiwan are not export oriented, but local market oriented. They also found that R&D-employee ratio (RDE) is insignificant throughout the sample.

Agosin and Bravo-Ortega (2012, hereafter AABO) after using several measures of export concentration and found that openness to trade induces export specialization, not export diversification. In addition, they, found that, higher schooling or education contributes to export diversification. UNCTAD (2018) also examined the determinants of export diversification in LDCs for the period of 2003-2015 using 145 developing countries. Generally, they found that MVA, trade openness and FDI has positive and significant impact to export diversification.

2.2.2 Indirect impact of FDI and trade openness on firm's export competitiveness through various channels.

(i) Technology as transmission channel:

The empirical literature on export productivity also identified technology as a condition for FDI to influence export productivity through technological spillover effect and diffusion. In addition to that, Javorcik (2004) using Lithuanian firm-level panel data tested for productivity if it can be an FDI spillover through backward and forward linkages. They confirmed the presence of productivity spillovers from FDI taking place through backward linkages.

In contrast, Bwalya (2006) using Zambian firms found that, knowledge spillovers improve firms export competitiveness rather than technology spillovers.

(ii) Trade openness and FDI as a conditional effect:

Some empirical studies emphasized the importance of trade policy regimes and ownership structures as determinants of exporting firms. Balasubramanyam et al. (1996) conducts a study that covers 46 developing economies and found that effect of FDI to host country's export are stronger if they pursue a policy of export promotion rather than import substitution. Rădulescu and Şerbănescu (2012) also FDI works better promoting export competitiveness in the tradable sector in Central and Eastern European countries. Mijiyawa (2016) used data on African countries claimed that FDI inflows positively and significantly support exports of goods and services.

It is worthy to emphasize that the effects of FDI inflows on a developing country may not necessarily be positive. UNCTAD (1999) argued that FDI could provide too few or unsuitable kind of assets and resources for a particular economy, which would does not fit with local capabilities and demand. Foreign firms may import the major proportion of higher value-added intermediate products, restricting purchases from indigenous firms to low value-added goods.

Gamariel and Hove (2019) investigating the direct and transmission channels of FDI in SSA region using GMM method. The results suggest the positive and significant impact of FDI on export competitiveness while unit labour costs and reduced foreign market access lower export competitiveness. Human capital and technological spill overs are the transmission channels through which FDI affects export competitiveness and the enhancement of domestic productivity. In turn, hinder local firms in the upgrading of indigenous resources and capabilities.

To conclude, a larger proportion of empirical literature on FDI concentrates on its impact on economic growth or export volumes, rather than export competitiveness per se. A few empirical studies have analysed the impact of FDI on export competitiveness, with the majority of these studies focusing on the impact of FDI on productivity, and implicitly on export competitiveness. Moreover, many studies are conducted in Asia and other developing countries

which left African countries to be unexplored. Furthermore, the effect of FDI and trade openness on export diversification is still unexplored area, especially to African economies. This study will move further stage to explore the role of FDI, and trade openness on a firm's export competitiveness and diversification.

3 Methodology

3.1 Theoretical relationship among FDI and Trade openness and Export Competitiveness

In a theoretical model, Helpman and Krugman (1985) show that rising intra-firm trade has significantly associated with FDI which ultimately boosts export competitiveness. Some analysts later detailed that FDI improves the export performance of the host countries by bringing new production based on modern technology and knowledge and integrating domestic production into the global corporate system (Đurić, Ristić, & Đurić, 2016).

It is pertinent to believe that FDI enhances the competitiveness of the country's exports by increasing total factor productivity (Sultan, Z. 2013; Jana *et al*. 2017; Sahu and Pandey 2018). There is a widely accepted opinion that FDI enhances exports of the host country by augmenting domestic capital for exports, and facilitating access to new and large foreign markets, and providing training to local workforces (Zhang 2015; Vuksˇic & Kutan, 2007, Gamarie and Hove, 2019). In general perspective views, FDI stimulates exports from domestic sectors through industrial linkage or spillover effects, which further instigates high-demand stimulus for domestic enterprises and results in export promotion (Harrison, 1996; Fontagné, 1999).

In light of this, several factors have been found to influence the capacity of a country's export competitiveness and diversification. Trade openness is among the remarkably strong predictor of export performance in the region (Shobande, O. 2019), i.e., enhancements in trade facilitation have boosted R&D and creativity, improved commodity efficiency and boosting the manufacturing industry's export competitiveness (Hu and Yuanhong, 2020), through the establishment of marketing and distribution channels (Farole et al, 2014).

3.2 Method of Analysis

The main method used for estimating the model is static linear panel analysis of Fixed Effect (FE) and Random Effect (RE). In a panel data set comprises of (n) entities where each contains time (N) observations measured at "n" through (T) time span. Hence, the entire number of observations in the panel data is nT . In our study "*N*" is expected to be 5 EAC members, and *T* is expected to be 10 years. Preferably, the panel data have greater inconstancy and allow investigating more issues. Likewise, it is measured at regular time intervals whether annually, quarterly, or monthly that has greater inconstancy and permit to investigate more issues. However, unobserved factor in the dependent variable is always common in panel data analysis. It may be either consistent or varying influence.

Due to heterogeneous natures of the pooled dataset, observations for individuals may not be independent and the usual ordinary least squares method may provide biased estimates. Hence, we deploy panel data estimation techniques (FE model and RE model) to control for fixed or random individual differences. Hausman test has been applied to test for appropriateness of fixed (FEM) or random-effects model (REM). Also, Breuch-Pagan test has been applied to choose the best model between REM and POLS model. The common approaches utilized are FEM and REM applied to control for fixed or random individual differences among the EAC members.

3.3 Model Specification

Due to the cross-sectional structure of our data, we follow an empirical specification utilized in the export competitiveness and diversification literature for this type of data structure (Iwamoto & Nabeshima, 2012, Wen & Wang, 2012 and Gamriel & Have, 2019). We set up two models.

$$XC_{it} = \alpha_1 FDI_{it} + \alpha_2 TO_{it} + \alpha_3 EF_{it} + \alpha_4 TECH_{it} + \alpha_5 R\&D_{it} + \alpha_6 MVA_{it} + \varepsilon \ldots \quad (1)$$

$$XD_{it} = \alpha_1 FDI_{it} + \alpha_2 TO_{it} + \alpha_3 EF_{it} + \alpha_4 TECH_{it} + \alpha_5 R\&D_{it} + \alpha_6 MVA_{it} + \varepsilon \ldots \quad (2)$$

Where the subscript *t and i* signifies as time and country orderly, equation one intends to examine the effect of FDI and TO on a firm's export competitiveness. While equation two presents the effect of FDI and TO on firm's export diversification, the dependent variable in the first model is the ratio of export competitiveness (XC) that is proxied by the export sophistication index (*Expy*), while **XD** denotes as export diversification based on a Herfindhal index, which stands as a dependent variable in the second model.

In terms of independent variables, FDI denoted as a ratio of GDP and **TO** refer to trade openness are explanatory variables of interest. Moreover, the study employs others as the control variables, include economic freedom index (**EF)**, level of technology (**TECH),** research and development**(R&D)**, and manufacturing value added **(MVA)**, and ε is the stochastic error term. The details descriptions of the dependent variables are elaborated below:

(i) Export Competitiveness

Export competitiveness refers to the differential between the country's export price and that its rivals in their regular markets. On the assumption that a country's export prices do not depend on the country of destination, competitors' export prices are determined by a double-weighted pattern. To measure the level of export competitiveness in a country, we referring to Hausmann *et al*. (2006)'s index of productivity of the export basket of a particular country called *EXPY*. Therefore, first should compute an index that executes the level of export competitiveness of a product, known as *PRODY*. This index is a weighted average of the GDP per capita of the countries exporting products. Algebraically

$$PRODY_k = \sum_j \frac{(x_{jk}/X_j)}{(x_{jk}/X_j)} Y_j$$

Where in the above expression, $x_{jk}$is the total volume of exporting product *k* by country j;X_j is the volume of all exported goods of a country j, and Y_j refers to the level of country j's GDP per capita, measured as a real GDP per capita in PPP. The more export competitiveness obtained as much as when the value of *PRODY* for a goods *k* is great enough. The given assumption of this index reveals that the products that are produced and exported by the wealthier countries

need more advancement and a complex set of capabilities and therefore is more competitive. The competitive level related to a country j's export $EXPY$ subsequently is defined as:

$$EXPY_j = \sum_k ({}^{x_{jk}}/_{Xj}) PRODY_K$$

Therefore, export competitiveness is expressed as a sum of the weighted productivity level related to each exported product *k*, $PRODY_K$ with the weights simply denoted as the share of the products value from the total exported product in a country. This index determines the country's ability to export products that are produced domestically and exported by the wealthier countries. The highest value of $EXPY_j$ is, the greater the level of competitiveness of a country basket of exported goods is.

(ii) Export Diversification

Diversification of the exported goods refers to the changing of the country export structure. This can be accomplished by altering the current commodity basket or by enhancing it by innovation and technology. This study adopts the work of Hwang (2006) and Harding & Javorcik (2010) and later introduces a measurement of export diversification based on a Herfindhal index. It starts with the computation of the Herfindahl index of the shares of export in country *i* at time *t* using export data at the SITC 4-digit level of United Nations.

$$Herfindahl_{it} = ((\sum_{i=1}^{N} {}^{x_{it}}/_{X_{it}}) * 100)$$

Where x_{it} denotes as a value of product exported from country *i* and time *t* and X_{it} is the value of export of all products from *i* at time *t*. Next, using this index, we compute the export diversification index;

$$\mathbf{(100 - Herfindahl_{it}) = Export\ Diversification\ (ED)\ Index}$$

The index of export diversification ranges between 0 and 100. The highest the value of the index being obtained, the more diversified the export basket of a country realized. In this scenario, diversification signifies that no heavy dependence on a particular product for exporting. The description of the variables used in this study describe in detail in table 2.4.

3.4 Data Sources

We apply a balanced panel data for 5 member countries of the EAC, namely Tanzania, Kenya, Uganda, Rwanda and Burundi. The datasets contain a wide range of information for each country including export competitive index, diversification index, R&D, technology, and most crucial, the share of trade openness and FDI. The lists of these variables were sourced from credible databases such as World Development Indicators (WDI), UNCTAD, Heritage foundation and UNIDO. The period under discussion was limited by the availability of data to the interval 2010 to 2019. The source of data as described in table 2.4.

Table 2.4 Description of the Variables

Variable	Description	Measurements	Previous Author	Data source	Hypothesis
Export competitiveness	Sum of the weighted productivity level related to each exported products k, 〖PRODY〗_K with the weights simply denoted as the share of the value of products from the total exported product in that particular country	The index of export competitiveness EXPY (RCA index)	Wen & Wang, (2012); Gamariel& Hove (2019);	COMTRADE	
Export Diversification	Herfindahl index of the shares of export in country i at time t using export data, then Next, using this index, the export diversification index computed;	The index of export diversification ranges between 0 and 100	Jayaweera, (2009) Nabeshima& Iwamoto (2012)	COMTRADE	+
FDI	Foreign Direct inflows (US$)	*Percentage FDI/GDP *Total FDI in manufacturing sector	Zhang 2005; Gamariel& Hove (2019)	UNCTAD	+
Trade openness	Sum of export and import over GDP ratio in US$	Export-import/GDP ratio	Keho (2017); Huchet*et al.* (2018)	UNCTAD /World Bank	+
Economic freedom (EF)	Is an index which is designed to measure It comprises four main items (1) rule of law (2) government size (3) Regulatory efficiency and (4) Open market.	Range from 0 to 100	Dutta & Williamson (2016); Tra (2019)	Heritage Institute	+
TECH	Level of technology that is embedded in industry	High-technology exports (% of manufactured exports)	Ustabaş & Ersin (2016), Kabaklarli, *et al.* (2018).	World Bank	+
MVA	The domestic efforts in expanding the manufacturing level in the country	Manufactured Value added per year (US$)	Hassen (2021).	UNIDO	+
R&D	New technology which creates the opportunity for local firms to upgrade their technological and innovative skills, thereby enhancing their export performance.	The total expenditure in education as a percentage of GDP	Gamariel & Hove (2019)	World Bank	+

4.0 Results and Discussions

4.1 Summary Statistics and Correlation matrix.

Table 2.5 and 2.6 indicates a summary of the descriptive statistics and correlation matrix respectively. We have a total of 50 country-year observations, indicating that the panel is well-balanced. Almost all variables have the lowest standard deviation than the mean which implies a small variation among the studied variables at the individual country level. This we believe is due to the fact that most of the nations formed EAC exhibiting the common socio-economic and institutional indicators.

On the average the percentage mean of trade openness (LNOPEN=0.3852) does not vary highly compared to inflow of FDI (LNFDI=0.2657). The minimum value of FDI is attributed to the lowest rate of FDI inflow in Burundi (-6.269) reported in 2016, perhaps due to lack of human and financial capital and political instability. With regards to highest value of FDI (1.744) that was reported in Rwanda in 2014 which is largely contributed by positive performance of tea cultivation (9%) and coffee (10%), easy to do a business and the highest score in the controlling cases of corruption. Among all variables, economic freedom has highest mean value (EF=5.82) followed with Manufacturing value added (LNMVA=2.16)

Table 2.5 Descriptive Statistics

LNFDI	0.2656692	1.83251	50
LNOPEN	3.852205	0.1780366	50
LNEXPY	4.656754	1.256571	50
RCA	0.245943	0.1349255	50
XD	0.7500819	0.057136	50
R&D	1.377254	0.3832945	50
TECH	1.480271	0.8526951	50
EF	5.8206	5.267901	50
LNMVA	2.16366	1.125611	50

Source: Author's Calculation.

The results from Table 2.6 indicate a negative association between total FDI, trade openness and export competitiveness (lnexpy). The positive linear association does exist between manufacturing value added (MVA), technology, R&D, economic freedom and export competitiveness. This reflects that the value addition among the manufacturing sectors and technology promote the export competitiveness of the EAC member countries. Finally, there is no indication of multicollinearity problem among the studies variables.[4]

[4] We applied two stage least squares to check to if there is endogeneity test. We used Sargan test and Basman test to identify if there is endogeneity test, but the results show that there was no endogeneity.

Table 2.6: Pairwise Correlation

	EXPY	FDI	R&D	MVA	XD	FDI_STOCK	RCA	OPEN	TECH	EF
EXPY	1.000									
FDI	-0.1008	1.000								
R&D	0.2124	-0.4126	1.000							
MVA	0.5946	0.5361	-0.0844	1.000						
XD	-0.5996	-0.2909	-0.1664	-0.708	1.000					
FDISTOCK	0.0261	0.6716	-0.6428	0.5906	-0.1714	1.000				
RCA	0.7134	0.3407	-0.0787	0.7641	-0.8972	0.3163	1.000			
OPEN	-0.1797	-0.3092	0.5138	-0.2355	0.0771	-0.261	-0.1315	1.000		
TECH	0.3658	-0.1961	0.1355	-0.0088	-0.1951	-0.1674	0.1315	0.0627	1.000	
EF	0.6029	0.6545	-0.61	0.1362	0.0179	0.6306	-0.0097	-0.1339	-0.2854	1.000

Source: Author's Calculation.

4.2 Selected Method of analysis

Before selecting appropriate method of analysis, we used all three traditional panel methods, Random Effect (RE), Fixed Effect (FE) and Pooled Ordinary Least Squares (POLS). To get best model specification three tests were applied including, Chow test to check the best model between fixed effect and Pooled OLS model. We also used Breusch-Pagan (LM) test of serial correlation to gauge the best model between Pooled OLS and the REM, and finally, Hausman test was applied to capture the best model between the Random and Fixed Effect Model.

Generally, after executing all tests, the results show that (See table 2.7 and 2.8, 2.9) given all three techniques, FE appeared to be an appropriate technique as the value of the Hausman test and Chow test was significant across all estimated models. Therefore, FE was considered in discussions to the rest of all regressions of this study.

However, we also report the findings of random effect for justifying the appropriateness of the FE method. Finally, the estimated models are corrected for standard errors as previous results were shown that the model suffer from the heteroscedasticity as the coefficient of Breusch-Pagan test was statistically significant across all regressions.

5.0 Estimation Results

5.1 Impact of FDI inflows and Trade Openness on firms' export competitiveness

Table 2.7 shows the effect of FDI inflows and trade openness on export competitiveness (**LNEXPY**) for the EAC's firms. The main findings are presented in column (1) and (2) using both FDI inflows and FDI stock using FE approach. Also, column (3) and (4) present the results from RE approach. Also, we use alternative measure of export competitiveness (**RCA**) as a robust test using both RE and FE methods (Table 2.8).

According to the results in column one, the coefficient of FDI inflows has a positive impact on the firm's export competitiveness (FDI=0.1588) and is statistically significant.[5] Similar conclusions were reached in Paul, (2011). To check the robustness of our results, the estimation substitutes the FDI inflow with FDI stock and results still appear to have a positive and significant impact on export competitiveness, this can be easily justified that FDI inflow into EAC members improves the export competitiveness. Prasanna (2010) for India and Muzurura, *et al*. (2001) for Zimbabwe are some few studies that found a positive and significant effect of FDI on firms export competitiveness.

Table 2.7: Corrected Fixed and Random Effects: Impact of FDI and trade openness on export competitiveness

Dependent Variable: Export Competitiveness (**LNEXPY)**				
Coefficients	**Fixed Effect**		**Random Effect**	
	1	2	3	4
C	-0.50337	12.06853	-0.47949	1.63675
FDI	0.15888*	NA	-0.0172712	NA
FDI_STOCK	NA	0.24566*	NA	0.13519
TO	-0.55479	-1.02839	-0.06481	-1.98717
MVA	0.42462	-0.11059	0.76423*	0.68909*
TECH	0.09367*	0.13099*	0.28424*	0.28494*
R&D	-0.85812**	-0.38989	-0.66956*	-0.50369
EF	-0.01005	0.02257	-0.17633*	-0.18674**
Breuch-Pagan test	[0.00]	[0.00]		
Chow test	[21.68]*	[17.32]*		
Hausman test			(89.29)*	(55.51)*
Breuch-Pagan test	[325]	[215.57]		
N	50	50	50	50

Note: * implies statistically significant at 5 percent level of significance, the number within [ ] implies t-statistics, and within (….) implies chi-square value.

[5]We also use sample size for the period 2009-2018 the results remain the same (positive and significant) to conserve the space we have not reported here. The results are available upon request.

The positive effect of FDI is due to the involvement of EAC firms' in producing manufactured products that has intra-EAC export such as food and beverage as illustrated within the figure 2.1 and 2.2. Also, most of FDI concentrates in manufacturing sectors during the period 2016-2019 as explained in figure 2.3. The manufacturing sector remains a leading sector in attracting foreign investment due to the introduction of an online licensing system with stringent requirements and verification. Recently, China was the largest investor in 2019, accounting for 59.7 percent of FDI as explained in EAC (2019).

Table 2.8 Corrected Fixed and Random Effects: Impact of FDI and trade openness on export competitiveness:

Dependent Variable: Export Competitiveness (**RCA)**				
Coefficients	**Fixed Effect**		**Random Effect**	
	1	2	3	4
C	3.636473	3.97526	-1.395814*	-1.978792
FDI	0.0036933	NA	-0.0016623	NA
FDI_STOCK	NA	0.0066386	NA	-0.048552*
TO	-0.213617	-0.2270596	-0.0563714	0.0042841
MVA	-0.139824	-0.1538883	0.0963985*	0.1178755*
TECH	0.0071307	0.008167	0.0187243	0.0185691
R&D	-0.126684	-0.116742	-0.025821	-0.08888
EF	0.00985*	0.0094997	-0.0029733	-0.0010154
Breuch-Pagan test	[0.00]	[0.00]		
Chow test	[13.23]*	[11.62]*		
Hausman test			(23.80)*	(22.54)*
Breuch-Pagan test	(61.95)	(53.82)		
N	50	50	50	50

Note: * implies statistically significant at 5 percent level of significance, the number within [ ] implies t-statistics, and within (….) implies chi-square value

Ayaji (2006) elaborated that, FDI is the primary means of technology transfer. Technology transfer and technical spillovers result in an improvement in factor productivity and resource

utilization efficiency, which leads to increase capacity and competitiveness in domestic production. Similarly, Kutan and Vuksic (2007), Achandi (2011) and Haq (2012) evidenced that FDI positively impacts the export performance of a host economy.

Also, the results show that, trade openness (TO) have a negative but not statistical impact (-0.55479) on the export competitiveness across all regressions (column 1 through 4),[6]. Meanwhile the trade openness is not enough to stimulate export competitiveness. The insignificant impact of trade openness to export competitiveness may be linked to the fact that most developing countries particularly EAC member export primary products while import expensive manufactured products and intermediate goods. In turn, due to stiff competitions from the foreign competitors, most local exporters are losing their market due to higher cost of production.

Also, due to large shares of primary products exports by EAC members, they face seasonality's, low value added, fluctuation of the price and poor quality. For example, in figures 2.1, 2.2 and 2.3 show that, Tanzania and Burundi are leading exporters of primary product such as metal products and food and beverage. Also, figure 2.3 reveals that major exports of EAC member are food and beverage. (See, EAC, 2017 for details).

The impact of economic freedom (EF) which also presents an idea of globalization on the firm's export competitiveness was appeared to have a negative (EF=-0.01005) but statistically insignificant (column 1). However, we cannot claim the robustness of these results as the best method of the specification is Fixed Effect Model. Moreover, the coefficient of technology (TECH) is appeared to have a positive impact on competitiveness across all regressed models.

The impact of MVA has a positive impact but is statistically insignificant on the firm's export competitiveness (column 1 and 2). Also, R&D has become statistically insignificant which is supported by several literatures (UNCTAD, 2018; Gamariel and Hove, 2019; ABBO, 2012). In

[6] We also use sample size for the period 2009-2018 the results remain same (positive and significant)

contrast, the impact of technology on a firm's export competitiveness is a positive and statistically significant impact throughout all regressions (column 1 and 2).

5.2 Impact of FDI inflows and Trade Openness on firms' export diversification

Table 2.9 shows the impact of FDI inflows and trade openness on product export diversification for the EAC's firms. The main results are presented in column (1) through (2) while column (3) through (4) shows the results by using random effect. Similar to previous discussion, the variable of FDI is expressed as overall FDI inflows and by FDISTOCK which stands as aggregate stock of FDI.

Starting with column one **(1)** the results suggesting that overall FDI inflows has a positive (FDI=0.017) and significant impact on the firm's export product diversification. Generally, the above results suggest that a FDI inflow is important for EAC members if they want to diversify their product export. These results are also supported by UNCTAD (2018) who have also found a positive and significant impact of FDI on firm's export product diversification for African countries.

In addition to that, the impact of trade openness (TO) has a positive and significant impact on the firm's export product diversification throughout all regressions (column 1 through 2). This implies that as the more open economy to EAC region, it enhances the ability of firms to diversify their product export. Our results are consistent with ABBO (2012) for developing countries and Gamariel and Hove (2019) for SSA who found a positive and significant effect of trade openness on export diversification. However, there is a need to promote trade openness in order to improve product diversification unlike concentration of food and beverage as shown in table 2.1, 2.2 and 2.3.

According to Osakwe *et al*. (2018) advocate that, the least developed nations with more openness to trade (based on trade intensity) have more varied export structures than those with less open trade. They also show that trade liberalization, in the form of lower tariffs, helps

developing countries to diversify their export products, and the results for the developing world are promising.

Table 2.9 Corrected Fixed and Random Effects - Impact of FDI and trade openness on Product Diversification.

Dependent variable: Export diversification, **Herfindahl index (XD)**				
Coefficients	**Fixed Effect**		**Random Effect**	
	1	2	3	4
C	0.0653*	-0.13968	1.7517*	1.9622*
FDI	0.0036***	NA	0.00223	NA
FDI_STOCK	NA	0.00385	NA	0.02981*
TO	0.08774*	0.0815**	0.02618	-0.1299
MVA	0.04198*	0.03285	-0.03825*	-0.05058*
TECH	-0.01254	-0.01172	-0.01189	-0.01182
R&D	-0.0021	0.01034	-0.04375*	-0.0045
EF	-0.0022	-0.0023	-0.017	-0.00261
Breuch-Pagan test	[0.000]	[0.000]		
Chow test	[19.21}	[14.91]		
Hausman test			(27.24)	(24.94l)
Breuch-Pagan test	(6.34)	(6.40)		
N	50	50	50	50

Note: * implies statistically significant at 5 percent level of significance, the number within [ ] implies t-statistics, and within (….) implies chi-square value

The impact of economic freedom on the firm's export product diversification is negative throughout the regressions (see, column 1-2) but is statistically insignificant. (Table 2.9). Generally, this implies a serious problem in economic policy to EAC members toward the export-oriented strategies. The impact of Manufactured value added (MVA on export diversification become positive and significant in first column while insignificant in second column[7]. Moreover, the impact of technology becomes insignificant with negative sign

[7]We ignore the results of random model which show negative and statistically significant as our Hausman test prefer Fixed Effect model.

throughout all regressions. Mondal and Pant (2014) supported our results, in the case of Indian manufacturing firms for the period 2001-2006. They argued that purchase of imported technology does not lead to export competitiveness and diversification like presence of foreign firms. The impact of R&D is negative but not statistically significant to all regressions. The results also supported by Mondal and Pant, (2014).

6.0 Conclusion and Recommendations:

To conclude these results, we recommend improving FDI linkage with EAC economic sectors. This can be achieved through managing FDI inflows and FDI-related policies to maximizes spill overs effect within EAC. To encourage emergence of FDI inflows from new partners in manufacturing sectors and establish platform for advertisement and exchange information. To design better infrastructures policy-related to overcome constraints for manufacturing sector, especially in transportation and logistics services, telecommunications and reliable power supply.

Also, regarding to specific recommendations to improve industrials competitiveness, manufacturing sector per se and export diversification within EAC report we insist EAC members to fast tracking and boost the recommendations from the EAC Industrial Competitiveness Report 2017 hereafter referred to EAC (2017). To mention them here, they are specified into four main policies mentioned as follows: Exploiting the opportunities offered by the dynamic EAC market. Diversifying and upgrading through realistic, well-defined, and comprehensive Strategies. Strengthening of forward and backward linkages to boost industrial and overall economic growth.

To recommend for further studies, we believe that our study concentrated on overall FDI effect to export competitiveness and diversification and in some cases in manufacturing sectors, it is worth also to breakdown this relationship into sub-sectors. For example, to examine the effect of FDI inflows from telecommunication, buildings, transportation, mining and also services on

firm's export competitiveness and diversification. The analysis of static dynamic panel threshold effect of globalization (FDI, trade openness) to export competitiveness and diversification is also useful at current policy dynamics. This can be done using Hansen panel dynamic threshold analysis. Also, to examine this study by considering tri-patriate economic integration is also useful. For example, how this export competitiveness and diversification can be observed by using intra-trade and intra-FDI inflows among economic integration such as EAC with COMESA, with SADC and reverse.

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Table 2. 2: Trend of Merchandise Trade in World Regions Compared to EAC Region

Destination/Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total EAC Exports	11,819.76	14,274.02	16,046.00	14,971.30	16,109.14	16,819.6	13,877.2	14,143.5	14,213.8	15,760.8
Intra-EAC Total Exports	2,237.75	2,564.12	3,154.96	3,698.56	3,230.41	2,823.0	2,631.4	2,977.4	3,170.5	3,162.8
COMESA	1,610.13	1,901.52	2,055.91	1,801.10	2,763.15	2,335.5	2,579.3	2,624.8	2,523.0	1,538.2
SADC	1,319.04	1,789.96	2,329.92	2,127.17	3,067.11	1,496.5	1,843.4	2,105.7	2,192.1	2,193.3
Rest of Africa	220.08	265.39	293.21	433.80	787.48	606.0	799.6	328.5	268.9	260.6
EU	2,193.58	2,520.97	2,512.99	2,183.75	2,663.57	2,398.8	2,347.9	2,378.0	2,450.7	2,280.9
USA	362.56	385.56	411.83	449.47	651.17	521.9	667.4	751.2	600.1	623.6
Total Exports to Rest of the World	3,876.62	4,846.50	5,287.18	4,277.45	2,946.35	6,054.1	5,932.1	5,394.9	5,285.8	6,479.5

Source: Author's calculations from EAC reports 2015-2019.

Table 2.2 FDI Inflows to EAC Region, 2010-2014 (US$ million and % growth)

Country	2010	2011	2012	2013	2014	Percentage Growth 2010/2014
Burundi	0.78	3.36	0.60	7.41	47.06	5928.97
Kenya	1,197.55	1,450.47	1,380.20	1,118.83	820.94	-31.45
Rwanda	250.50	1,19.11	254.96	257.60	458.90	83.19
Uganda	543.87	894.29	1,205.39	1,096.00	1,058.57	94.63
Tanzania	1,813.25	1,229.38	1,799.60	2,087.30	1,416.10	-21.90
Total	3,805.96	3,696.61	4,801.75	3,774.13	3,845.56	1.04
Av. Growth	11.792%	-2.87%	29.90%	-21.40%	1.89%	19.312%

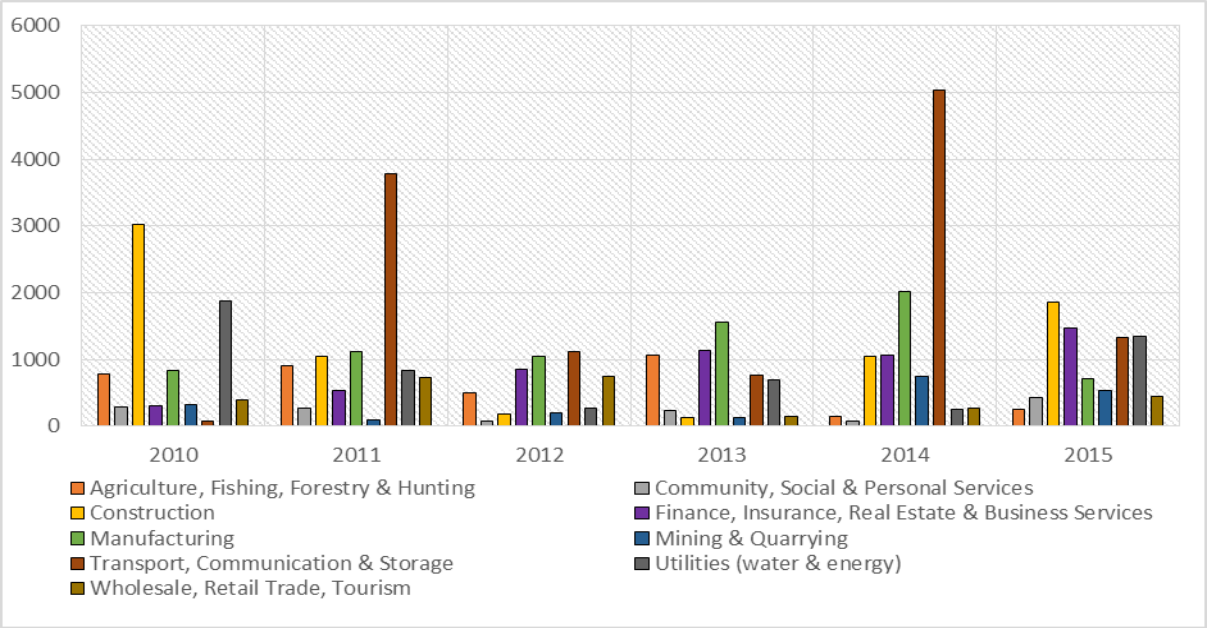
Source: Author's calculations from UNCTAD 2010-2014.

Table 2. 3 FDI Inflows to EAC Region, 2015-2019 (US$ million and % growth)

Country	2015	2016	2017	2018	2019	% Growth 2015/2019
Burundi	7.36	0.06	0.32	0.98	1.04	-85.80
Kenya	619.72	678.80	1266.13	1625.92	1332.44	115.00
Rwanda	379.80	342.30	356.44	381.91	420.16	10.63
Uganda	737.65	625.70	802.64	1055.35	1266.03	71.63
South Sudan	1560.80	864.00	937.70	1056.00	1112.40	-28.73
Tanzania	0.15	-7.85	1.42	60.14	17.90	11835.56
Total EAC	3305.48	2503.01	3364.65	4180.30	4149.97	25.55
Av. Growth	-14.04%	-24.28%	34.42%	24.24%	-0.73%	19.61%

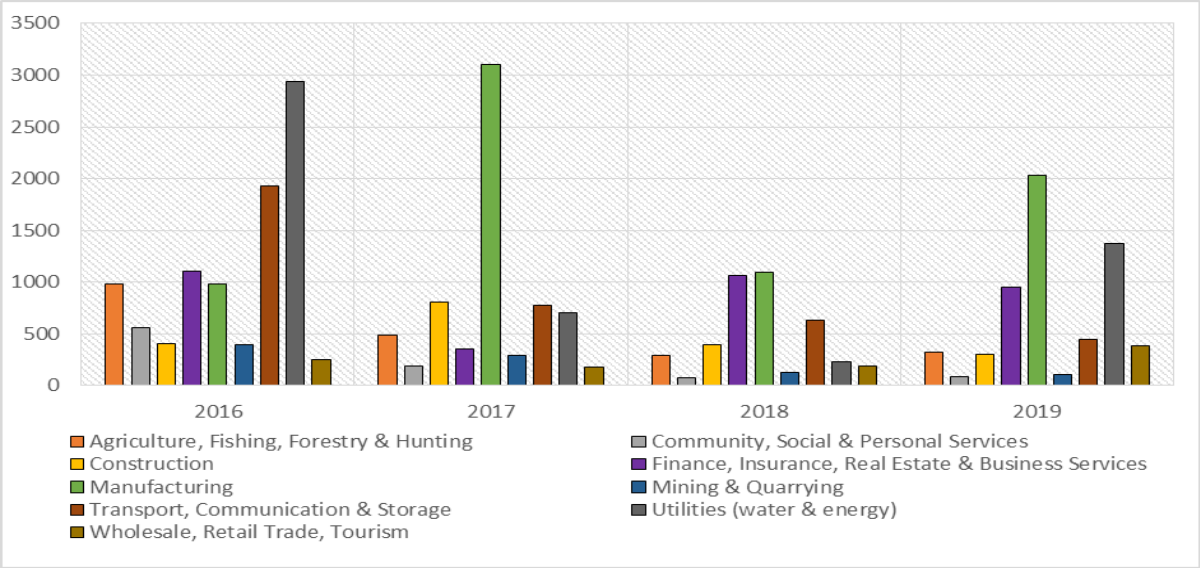
Source: Author's calculations from UNCTAD online data base, 2015-2019.

Figure 2. 1 Sectoral distribution of FDI inflows to East African community member's states



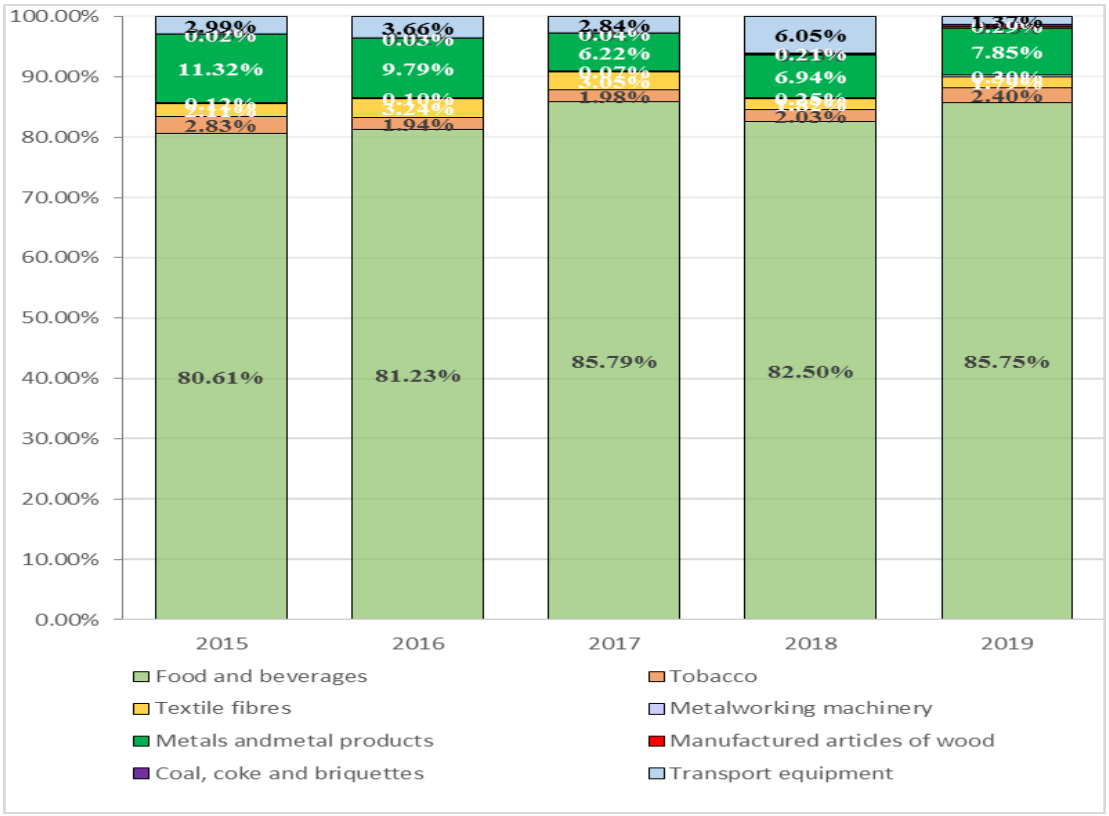
Source: Author's calculations from EAC report 2010-2015

Figure 2. 2 Sectoral distributions of FDI inflows to East African community member's states



Source: Author's calculations from EAC report 2015-2019

Figure 2. 3 EAC manufactured exports by sector (2014-2019)



Source: COMTRADE online data base 2021 and authors' compilation

Table 2.4 Description of the Variables

Variable	Description	Measurements	Previous Author	Data source	Hypothesis
Export competitiveness	Sum of the weighted productivity level related to each exported products k, 〖PRODY〗_K with the weights simply denoted as the share of the value of products from the total exported product in that particular country	The index of export competitiveness EXPY (RCA index)	Wen & Wang, (2012); Gamariel& Hove (2019);	COMTRADE	
Export Diversification	Herfindahl index of the shares of export in country i at time t using export data, then Next, using this index, the export diversification index computed;	The index of export diversification ranges between 0 and 100	Jayaweera, (2009) Nabeshima& Iwamoto (2012)	COMTRADE	+
FDI	Foreign Direct inflows (US$)	*Percentage FDI/GDP *Total FDI in manufacturing sector	Zhang 2015; Gamariel& Hove (2019)	UNCTAD	+
Trade openness	Sum of export and import over GDP ratio in US$	Export-import/GDP ratio	Keho (2017); Huchet *et al.* (2018)	UNCTAD /World Bank	+
Economic freedom (EF)	Is an index which is designed to measure It comprises four main items (1) rule of law (2) government size (3) Regulatory efficiency and (4) Open market.	Range from 0 to 100	Dutta & Williamson (2016); Tra (2019)	Heritage Institute	+
TECH	Level of technology that is embedded in industry	High-technology exports (% of manufactured exports)	Ustabaş & Ersin (2016), Kabaklarli, *et al.* (2018).	World Bank	+
MVA	The domestic efforts in expanding the manufacturing level in the country	Manufactured Value added per year (US$)	Hassen A Wako (2021).	UNIDO	+
R&D	New technology which creates the opportunity for local firms to upgrade their technological and innovative skills, thereby enhancing their export performance.	The total expenditure in education as a percentage of GDP	Gamariel & Hove (2019)	World Bank	+

Table 2.5 Descriptive Statistics

LNFDI	0.2656692	1.83251	50
LNOPEN	3.852205	0.1780366	50
LNEXPY	4.656754	1.256571	50
RCA	0.245943	0.1349255	50
XD	0.7500819	0.057136	50
R&D	1.377254	0.3832945	50
TECH	1.480271	0.8526951	50
EF	5.8206	5.267901	50
LNMVA	2.16366	1.125611	50

Source: Author's Calculation.

Table 2.6: Pairwise Correlation

	EXPY	FDI	R&D	MVA	XD	FDI_STOCK	RCA	OPEN	TECH	EF
EXPY	1.000									
FDI	-0.1008	1.000								
R&D	0.2124	-0.4126	1.000							
MVA	0.5946	0.5361	-0.0844	1.000						
XD	-0.5996	-0.2909	-0.1664	-0.708	1.000					
FDISTOCK	0.0261	0.6716	-0.6428	0.5906	-0.1714	1.000				
RCA	0.7134	0.3407	-0.0787	0.7641	-0.8972	0.3163	1.000			
OPEN	-0.1797	-0.3092	0.5138	-0.2355	0.0771	-0.261	-0.1315	1.000		
TECH	0.3658	-0.1961	0.1355	-0.0088	-0.1951	-0.1674	0.1315	0.0627	1.000	
EF	0.6029	0.6545	-0.61	0.1362	0.0179	0.6306	-0.0097	-0.1339	-0.2854	1.000

Source: Author's Calculation.

Table 2.7: Corrected Fixed and Random Effects: Impact of FDI and trade openness on export competitiveness

Dependent Variable: Export Competitiveness (**LNEXPY)**				
Coefficients	**Fixed Effect**		**Random Effect**	
	1	2	3	4
C	-0.50337	12.06853	-0.47949	1.63675
FDI	0.15888*	NA	-0.0172712	NA
FDI_STOCK	NA	0.24566*	NA	0.13519
TO	-0.55479	-1.02839	-0.06481	-1.98717
MVA	0.42462	-0.11059	0.76423*	0.68909*
TECH	0.09367*	0.13099*	0.28424*	0.28494*
R&D	-0.85812**	-0.38989	-0.66956*	-0.50369
EF	-0.01005	0.02257	-0.17633*	-0.18674**
Breuch-Pagan test	[0.00]	[0.00]		
Chow test	[21.68]*	[17.32]*		
Hausman test			(89.29)*	(55.51)*
Breuch-Pagan test	[325]	[215.57]		
N	50	50	50	50

Note: * implies statistically significant at 5 percent level of significance, the number within [ ] implies t-statistics, and within (….) implies chi-square value.

Table 2.8 Corrected Fixed and Random Effects: Impact of FDI and trade openness on export competitiveness:

Dependent Variable: Export Competitiveness (**RCA)**				
Coefficients	**Fixed Effect**		**Random Effect**	
	1	2	3	4
C	3.636473	3.97526	-1.395814*	-1.978792
FDI	0.0036933	NA	-0.0016623	NA
FDI_STOCK	NA	0.0066386	NA	-0.048552*
TO	-0.213617	-0.2270596	-0.0563714	0.0042841
MVA	-0.139824	-0.1538883	0.0963985*	0.1178755*
TECH	0.0071307	0.008167	0.0187243	0.0185691
R&D	-0.126684	-0.116742	-0.025821	-0.08888
EF	0.00985*	0.0094997	-0.0029733	-0.0010154
Breuch-Pagan test	[0.00]	[0.00]		
Chow test	[13.23]*	[11.62]*		
Hausman test			(23.80)*	(22.54)*
Breuch-Pagan test	(61.95)	(53.82)		
N	50	50	50	50

Note: * implies statistically significant at 5 percent level of significance, the number within [ ] implies t-statistics, and within (….) implies chi-square value

Table 2.9 Corrected Fixed and Random Effects - Impact of FDI and trade openness on Product Diversification.

Dependent variable: Export diversification, **Herfindahl index (XD)**

Coefficients	**Fixed Effect**		**Random Effect**	
	1	2	3	4
C	0.0653*	-0.13968	1.7517*	1.9622*
FDI	0.0036***	NA	0.00223	NA
FDI_STOCK	NA	0.00385	NA	0.02981*
TO	0.08774*	0.0815**	0.02618	-0.1299
MVA	0.04198*	0.03285	-0.03825*	-0.05058*
TECH	-0.01254	-0.01172	-0.01189	-0.01182
R&D	-0.0021	0.01034	-0.04375*	-0.0045
EF	-0.0022	-0.0023	-0.017	-0.00261
Breuch-Pagan test	[0.000]	[0.000]		
Chow test	[19.21}	[14.91]		
Hausman test			(27.24)	(24.94l)
Breuch-Pagan test	(6.34)	(6.40)		
N	50	50	50	50

Note: * implies statistically significant at 5 percent level of significance, the number within [ ] implies t-statistics, and within (….) implies chi-square value