Mapping export status changes and firm productivity: Evidence from EAC countries

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Abstract

This study tests whether firms in the EAC that supply in the foreign markets are in line with the learning by exporting hypothesis, in view of the differing performance indicators between exporters and non-exporters in these economies.

The data for this study is constructed from the World Bank Enterprise Survey for four EAC countries (Tanzania, Kenya, Uganda and Rwanda) between 2006 and 2013. Similar to other studies, the study finds a statistically significant performance difference in terms of labour productivity and average wage between exporting and non-exporting firms, which implies a premium for firms that sell in international markets. In addition, exporters exhibit higher growth of labour productivity relative to non-exporters, which is further evidence of learning by exporting. Comparison of the learning effectiveness between domestic and foreign owned firms indicates that domestically owned firms learn more from exporting than foreign owned firms; and that learning effects accumulate with time.

These results suggest that governments in these countries should design policies to promote export (such as promotion of EPZs, conducive investment climate and establishment of EPAs) so that many firms can participate in international trade and tap the export premium.

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Introduction

Firms in many developing countries are currently motivated to compete on world markets as part of the efforts to attain export-led industrialization, which would eventually lead to export led-economic growth (Van Biesebroeck, 2005; Rankin et al., 2006). When a firm goes international, it enjoys advantages of changes in behavior and performance (Silvente, 2005). The survival of a firm depends on whether it is a low-cost or a high-cost producer (Newman et al., 2016b) since world market trade is shaped by a number of factors, including among others, globalization, technological advancement and competition (MIT, POPC & UNIDO, 2012). In addition, increased trade liberalization in the past few decades and the subsequent production internationalization means that active domestic firms face both internal and external competition.

In general, there is agreement that a positive correlation exists between exporting and firm performance (indicated by a substantial difference between exporters and non-exporters) in terms of productivity, capital intensity, wages, innovation, etc. However, there is little agreement on the direction of causality. The questions for contention in this regard are these: Do firms invest in raising productivity before entering export market (i.e., self select into export market or learn to export)? Alternatively, is higher productivity a result of entering the export market (i.e., learning by exporting)? The debate as to which of these two hypotheses is true is yet to be settled to date.

The proponents of learning to export consider that potential exporters take deliberate decisions to invest in physical and human capital, research, and development, as well as purchase advanced technologies before entering the export market (Harrison & Rodriguez-Clare, 2010; Eliasson et al., 2012). This means that prior investment in productivity is crucial in order to cover costs that are associated with participation in international markets. On the other hand, proponents of learning by exporting consider the possibility of knowledge transfer through interacting with competitors and buyers in destination market (Pack & Page, 1994; Alvarez and Lopez, 2005; Newman et al., 2016a). The feedback from buyers contribute to improving product quality, design and packaging, whereas competitors offer avenue for knowledge, working practices (efficiency gain in operation) and technology diffusion (Clerides et al., 1998; Pack and Page, 1994; Blalock and Gertler, 2004; Newman et al., 2016b).

The inclination of the literature with regard to these two hypotheses tends to differ between developing and developed countries and between domestic and foreign ownership of firms. Whereas learning to export seems to be more inclined to firms in developed countries, learning by exporting characterises firms in developing countries (Newman et al., 2016b). Using four East African Community (EAC) countries (namely, Tanzania, Kenya, Uganda, and Rwanda) as case studies, this study aims to examine empirically whether firms in developing countries learn through engaging in exporting, thereby make a contribution to this ongoing debate in international trade and on firm performance.

The EAC are among the Sub-Saharan African countries that are still striving to industrialize with the objective of transforming their economies. Part of the efforts to industrialize depends on the extent of domestic firms' participation in international markets, which, is influenced by their capability to produce goods of high quality, comparable to similar ones elsewhere in the world (Newman et al., 2016b). Thus, the findings of this study will shed light on how the governments of these countries can harness their efforts to achieve export-led growth.

Literature Review

Theoretical Literature Review

It is undisputable in the literature that exporting firms possess specific desirable performance characteristics. However, the relationship between exporting and firm performance has competing explanations owing to the direction of causality. On the one hand is the literature in support of the self-selection hypothesis, which maintains that firms need to raise performance indicators before entering the international market. On the other hand, is the literature advocating the learning-by-exporting hypothesis, which asserts that a firm's performance increases after joining the export market. The theoretical linkages between these two hypotheses is as explained below.

Good performance prior to exporting

The contention in this regard is that firms have to invest in improving productivity prior to entry in the export market. This is to cover extra costs associated with supplying in international market (or the entry costs). These extra costs include market search costs, transit costs, modifying products to meet foreign demanded qualities, increased personnel for dealing with exportation and marketing costs (Bernard & Jensen, 1999; Bernard and Wagner, 1997). Such costs will not arise when deciding to supply only in the domestic market. With these costs, the more productive firms will have a better chance to sell in foreign markets. This further means that domestic firms that aspire to sell in foreign markets will first work to invest in productivity improvement before they begin to export. This behavior is consistent with the assumption of profit maximization by firms.

Good performance through exporting

The other channel of the linkage between exporting and firm performance is that firms may learn from exporting, thereby leading to gains in productivity. The theoretical justification of causality from exporting to firm performance hinges on three reasons (Bernard and Wagner, 1997; McKinsey, 1993). First is the increased supply or markets that make a firm to benefit from increased economies of scale in production. Normally, domestic markets especially those of developing countries are small and predicated on the growth of the economy. This means that for exporting firms, higher output and sales are expected as a result of market expansion relative to firms that choose to confine their outputs to the domestic market. Second, is the increased competition due to foreign demand (McKinsey 1993). McKinsey (1993) argues that, for the benefits to be realized the competition faced by a firm in a foreign market should be fiercer than that faced in the domestic market. If foreign competition is more intense, then an exporting firm will raise its performance efforts, including investment in innovative activities in order to keep up with the pace and avoid exiting the market. Last is product differentiation that results from customers' feedback on product quality. This means that based on the feedback, firms will strive to manufacture products with desired qualities by foreigners. This may further lead to technological and knowledge spillovers, in a way that foreign demanders may assist in technological diffusion as

local firms aspire to produce products of the required quality. In this regard, exporting serves as a conduit of technology and knowledge assimilation. These reasons imply that exporting firms will experience increased output and employment and ultimately productivity gains (Bernard & Jensen, 1999).

It may be that the learning by doing hypothesis is not as compelling as the self-selection hypothesis, as the latter is easier to explain. In practice however, the two hypotheses are never mutually exclusive.

Empirical Literature Review

The empirical literature on the productivity effects of international trade to exporters is vast and growing. Bernard and Jensen's (1995) pioneering study investigated the difference between exporters and non-exporters using US firm-level data and found a significant difference in economic performance between the two types of firms. However, the study did not provide explanations with regard to the direction of causality of such differences, i.e., whether the observed performance difference resulted from learning from exporting or from the conscious effort by the exporting firms prior to entering the export market. The Bernard and Jensen (1995) study gave rise to a proliferation of studies aiming at finding evidence in support of either hypothesis, aided by increased availability of national and international firm-level data.

The evolution of the studies on the causal effects of export and firm productivity falls categorically into two periods. Firstly, is the period towards the end of 1990s whereby findings with regard to the direction of causality between exporting and firm performance was more inclined to the self-selection hypothesis (Newman et al., 2016b). These findings tended to imply that highly productive firms become exporters. Further availability of rich panel datasets allowed for testing these effects in the USA (Bernard & Jensen, 1999), Germany (Bernard and Wagner, 1997) and Colombia (Clerides et al., 1998). The common finding was that firms in these countries took conscious or deliberate measures to invest in physical capital in order to raise production efficiency before they decided to export. Largely, the evidence in support of self-selection hypothesis was associated with studies from developed countries. In these countries, firms use advanced technology that is similar to their trade partners, which offers little to learn from such trade relations (Harrison & Rodriguez-Clare, 2010), particularly for the developing countries.

With time however, data from developing countries became available, which resulted in the empirical evidence in support of the learning-by-exporting hypothesis in the 2000s. For example, Van Biesebroeck (2005) used a system GMM approach on World Bank data for a project under Regional Program on Enterprise Development (RPED) covering 1992 and 1996 for a sample of nine Sub Saharan African countries (Burundi, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Tanzania, Zambia, and Zimbabwe). The study found an increasing productivity gap between exporters and non-exporters after exporters' entry into international markets. Rankin et al. (2006) used the extended

RPED survey data and found pessimistic evidence of self-selection to exporting among the five sub–Saharan African countries (Kenya, Ghana, Tanzania, South Africa and Nigeria). In addition, Blalock and Gertler (2004) using Indonesian case of manufacturing enterprises found a 2% increase in productivity due to exporting.

Aspects that contribute to learning by exporting include, among others, product improvement in terms of quality and packaging due to buyers' feedback from foreign markets, enhancement of firm's capability, such as working practices and managerial skills, and technological advancement (Pack & Page, 1994; Newman et al., 2016b). Moreover, as Martins and Young have posited, learning by exporting hypothesis address the situation of firms in developing countries due to the technological gap that they face relative to similar firms in the developed countries. Firms in developing countries produce their outputs using a technology that is below the technological frontier, a contention that Van Biesebroeck (2005) and Harrison & Rodriguez-Clare (2010) share. Furthermore, the destination of exports influences the extent of learning by exporting, since productivity benefits are higher for developing countries that export to industrialized countries (De Loecker, 2007). Other studies on African countries that provide evidence in support of the learning by exporting hypothesis are Bigsten et al. (2004) (Cameroon, Kenya, Ghana and Zimbabwe) and Mengistae & Patillo, (2004) (Ghana, Kenya and Ethiopia).

Further evidence show that the extent and duration of learning differ between local and foreign owned firms (Newman et al. 2016a). This Newman et al. 2016's study on Vietnam found the exporting productivity premium to be larger in foreign firms, though lasting longer among locally owned firms. In Mozambique, Cruz et al. (2017) examined productivity difference between firms that serve foreign markets and those that serve only the domestic market and found that the difference ranged between 15% and 24% in favour of firms that serve the foreign markets. These results were almost similar to those for Ethiopia, which ranged between 8% and 19% (Siba and Gebreeyesus, 2016).

Empirical findings on the relationship between export and firm performances based on the two discussed hypotheses tend to differ, depending on the level of economic development of a country under study. The reviewed literature shows a systematic pattern of evidence that the learning-by-exporting hypothesis is the one inclined more with the developing countries. This hypothesis examines the ex-post performance of the exporting firm after it has already entered the foreign market. To date, such evidence on foreign trade participation and productivity benefits for firms in developing countries is still insufficient. Thus, this study has developed a model to test for the learning-by-exporting hypothesis using firm level data for the East African Community (EAC) countries, which are in the category of developing countries.

This study uses data that are more recent. The used data set is advantageous over the RPED data used by Van Biesebroeck (2005) and Rankin et al. (2006) as it incorporates longer period of spells of trade liberalization for the countries under study. Most

African countries opened further their economies to foreign trade from the 1980s in the implementation of structural adjustment reforms (Biggs & Srivastava, 1996). Furthermore, RPED data is limited in terms of scope, covering only 200 manufacturing firms in four sectors, namely: foodstuffs, textiles and garments, wood working and metal working. In addition, Uganda and Rwanda were not part of the RPED survey. To the best of our knowledge this study sets out to be a pioneering cross-country among countries in the EAC.

Methodology

Data and descriptive statistics

This study uses the World Bank Enterprise Surveys (WBES) firm-level data for four East African countries, namely Tanzania, Kenya, Uganda, and Rwanda, to test the learning-by-exporting hypothesis. The selection of these countries among the EAC countries was predicated on the availability of panel datasets. Even though Kenya and Rwanda have already conducted three waves, the study used data only from the first two waves, to be able to compare results across the countries and to ensure a balanced panel. The first round of the survey for Tanzania, Uganda and Rwanda was in 2006, whereas for Kenya, it was in 2007. The second round for Tanzania, Uganda and Kenya was in 2013, whereas for Rwanda, it was in 2011. The study ran a balanced panel dataset to estimate the benefits that are associated with exporting or export premiums.

The World Bank Enterprise Surveys (WBES) collects data for both manufacturing and services firms classified according to four-digit industry classification codes using the United Nations' International Standard Industrial Classification (ISIC), Rev. 3.1. It uses standardized survey instruments and a uniform sampling methodology, thereby affording comparison across countries for this cross-country study. The survey uses stratified random sampling, with strata being business sector, size of the firm, classified according to number of employees, ((5-19 - small), (20-99 - medium) and (100+ - large)) and geographical location. The random sampling ensures equal probability of inclusion in the sample of firms in various strata. Furthermore, the survey included only formally registered companies by administering questionnaires to business owners and top managers.

The total sample for this study is 876 observations, obtained after data cleaning and organization. Of this total sample, Uganda has the largest share of about 45%, followed by Tanzania (26%) while Kenya and Rwanda contribute about 21% and 9% of the total sample, respectively (Table 1). In every country, the number of firms that trade in foreign markets is smaller than the number that trade only in the domestic market. Combined, only about 23% of the firms in the panel dataset trade in international markets.

Table 1: Distribution of Sampled Firms by Country and Export Status

Country	Exporters		Non-exporters		Total		% panel
	All	Panel	All	Panel	All	Panel	
Tanzania	172	49	904	175	1076	224	25.6
Kenya	341	62	727	118	1068	180	20.5
Uganda	225	76	1058	320	1283	396	45.2
Rwanda	26	13	295	63	321	76	8.7
Total	764	200	2984	676	3748	876	100

***Source**: Authors' construction from survey data*

Table 2 shows that not all firms that were interviewed in the first round of the survey were also re-interviewed in the second round, which implies that there was attrition of firms between the two waves of the survey. Although the total number of firms interviewed for wave 1and wave 2 of the survey was 3,748, this study used only 876 of these, as comprising of the joint sub-set of firms between the two waves. This means that 2,872 firms were interviewed in either round of the survey. Of the 1,744 firms interviewed in the first round, only 438 (about 25%) were re-interviewed in the second visit. Thus, 1,306 firms interviewed in the first round could not be interviewed in second round of the survey.

The approach similar to that used by Demena & Murshed (2018) was invoked, whereby a binary model was estimated to check if the firms dropped out of the survey due to systematic or random shocks. If the firms dropped due to systematic factors, then the remaining firms that form the panel could no longer be a representative sample of the original firms. The probit model was estimated, in which the dependent variable was assigned a value of 1 if a firm was interviewed only in the first round and 0 if it was interviewed in both rounds. The results from the estimation (presented table A1 of the appendix) indicates that labour and country dummy variables were statistically significant. More specifically, the results indicate that the propensity of firm's attrition decreases with an increase in firms' size, and it increases for firms in Tanzania, Kenya, and Uganda relative to Rwanda. The results indicate that most attrition is random and concerned with controls, but not on the variables of interest for this study. Hence, we considered the sample as still being roughly representative (Alderman et al., 2001; Fitzgerald et al., 1998).

Similarly, although 2004 firms were interviewed in the second round of the survey, only 438 firms (22%) were also interviewed in the first round of the survey. Of the 1,566 firms interviewed in only the second wave of the survey, 1,126 firms (about 72%) had begun operations before the first round of the survey but were not included in the sample of firms to be interviewed in the first round.

Table 2: Distribution of Studied Firms according to Export Status

	Exporters		Non-exporters		Total	
	All	**Panel**	**All**	**Panel**	**All**	**Panel**
Wave I (2006/2007)	287	91	1457	347	1744	438
Wave II (2011/2013)	477	109	1527	329	2004	438
Total	764	200	2984	676	3748	876

***Source**: Authors' construction from survey data*

Empirical Approach

The study firstly sought to establish whether there were significant differences in performance between exporters and non-exporters, without which there would not be a need to estimate a model to test learning by exporting effects. To this end, the study tested the mean difference between exporters and non-exporters across various

indices of firm performance. In addition, to enable comparison of data across countries and years, the study standardized all monetary values to US dollars. Then, to remove the price effects from all the variables converted to US dollars, we deflated the values using the GDP deflator, with 2000 as a base year.[1]

The results from the tests on differences in performance between exporting and non-exporting firms are summarized in Table 3. They show that exporting firms differ substantially from non-exporting firms in that they are more productive, associated with foreign ownership, larger in size, and pay higher wages relative to firms that sell in domestic markets only. Another significant difference is that exporting firms are likely to be more experienced in that they have more years of business operation. These findings are consistent with similar studies on other countries (Table 4). Some findings from the studies listed in Table 4 indicate that 17% of sample firms are associated with foreign ownership. Furthermore, small firms form about 52% of the entire sample, whereas medium and large constitute about 33% and 16%, respectively. These proportions reflect in general the size of firms in Africa, whereby most of them are small (Rankin et al., 2006).

Table 3: Characteristics of Exporting Firms

Variable	All firms			Exporting firms			Non-exporting firms			t test for two sample difference
	Mean	SD	N	Mean	SD	N	Mean	SD	N	t
lnLP(sales)	4.86	1.64	787	5.67	1.73	192	4.60	1.52	595	8.20
lnLP(value added)	7.24	0.47	526	7.39	0.54	154	7.18	0.42	372	4.79
export	0.23	0.42	876	-	-	-	-	-	-	-
foreign_owned	0.17	0.01	871	0.32	0.03	200	0.12	0.01	671	6.81
firmsize_small *(5-19 employees)*	0.52	0.50	876	0.22	0.42	200	0.61	0.49	676	-10.15
firmsize_medium *(20-99 employees)*	0.33	0.47	876	0.34	0.47	200	0.32	0.47	676	0.50
firmsize_large *(100+ employees)*	0.16	0.36	876	0.44	0.50	200	0.07	0.26	676	13.87
firmage	17.75	12.20	874	22.86	14.66	200	16.23	10.93	674	6.93
labour(L)	108.56	420.39	867	330.77	815.55	199	42.36	113.524	668	8.87
ln(wages/L)	2.75	1.27	759	3.14	1.42	183	2.63	1.20	576	4.81

***Source**: Authors' construction from survey data*

[1] The exchange rate used for conversion was the official exchange rate expressed as local currency unit (LCU) per US$, a period average. The source for both exchange rate and GDP deflator was World Development Indicators (WDI) website: http://data.worldbank.org/data-catalog/world-development-indicators.

Table 4: Export Premium findings from the Literature

Author(s)	Publication Year	Country/Region	Performance Indicator(s)
Bernard and Jensen	1995	USA	Labour productivity, average wage, employment
Bernard and Wagner	1997	Germany	Labour productivity, average wage, employment
Isgut	2001	Colombia	Labour productivity, large sized firms
Hansson and Lundin	2004	Sweden	Labour productivity, average wage, employment
Rankin et al.	2006	Sub Saharan Africa	Labour productivity, employment, large sized firms, foreign ownership
Were and Kayizzi-Mugerwa	2009	Kenya	Average wage
Demena et al.	2021	EAC	Labour productivity, value added

To estimate the effects of export on productivity changes, the standard estimation methods in the literature is the Ordinary Least Squares (OLS) or Fixed Effects (FE), although some studies use other methods, such as Propensity Score Matching (PSM), system or difference GMM, difference in differences, and quantile regression, among others.[2] This study has used the OLS and FE estimation methods.

Firstly, we estimate a balanced panel model to measure export premium in which the dependent variable is a measure of labour productivity. Labour productivity is used as a measure of firm performance, given two waves of the dataset. According to Hansson & Lundin (2004) total factor productivity (TFP) tend to generate "more noise" over a short period. However, the best performing enterprises will have higher productivity levels no matter which approach is used to measure productivity (Bernard & Jensen, 2004; Syverson, 2011; Newman et al., 2016b).

Thus, the model is specified as:

$$lnLP_{it} = \alpha + \beta export_{it} + \gamma_1 \ln L_{it} + \gamma_2 \ln (\mathrm{W}/L)_{it} + \theta X_{it} + \pi_i + \tau_t + \rho_k + \varepsilon_{it} \quad \text{.....(1)}$$

where,

LP_{it} is the dependent variable, measuring labour productivity

$export_{it}$ shows firm $i's$ export status at period t

L_{it} is a variable for labour

W/L_{it} is average wage

X_{it} is a set of control variables (age of the firm, ownership status and industry of the firm)

[2] See Martins & Yang (2009) for a summary of studies that use these estimation methods.

π_i represent fixed effects of the firm (unobserved variables such as managerial ability)

τ_t represent year dummy to capture time specific factors

ρ_k represent country dummies

ε_{it} is idiosyncratic error term

The inclusion of $\pi_i, \tau_t, and\ \rho_k$ as fixed effects in the model ensures that the export premium is due to their variations within firms. Following this study's objective, the export status at time t ($export_{it}$) is the variable of interest in model (1), whereby a statistically significant positive value for β indicates the mean labour productivity difference between exporters and non-exporters. However, there is no direction of causality warranted by equation (1). The equation shows only a correlation between exporting and productivity.

Suppose all productivity gains result from exporting; then, exporting firms should experience higher productivity growth rates after they begin to export. To test whether firms learn by exporting, the study adopted a standard empirical approach commonly used in the literature of mapping the export pattern of firms from the first wave to the next wave. As explained in Table 5, the approach involves decomposing the growth of labour productivity at firm level into continuous EXPORTERS, ENTRANTS, EXITERS and NON-EXPORTERS (Yasar et al., 2006; Silvente, 2005; Bernard & Jensen, 1999, 2004; Aw et al., 2000; Alvarez & Lopez, 2005; Hansson & Lundin, 2004).

Table 5: Mapping of export pattern of sample firms

Variable	Definition	N
EXPORTERS	1 if a firm exported in both waves; 0 otherwise	116
ENTRANTS	1 if a firm did not export in wave I but in wave II; 0 otherwise	102
EXITERS	1 if a firm did export in wave I, but not wave II; 0 otherwise	66
NON-EXPORTERS	1 if a firm did not export in either of the waves; 0 otherwise	592
	Total	**876**

Thus, the model to estimate the performance of firms based on export patterns is given as,

$$\Delta lnLP_{it+1} = lnLP_{it+1} - lnLP_{it} = \alpha + \beta_1 EXPORTERS_{it} + \beta_2 ENTRANTS_{it} + \beta_3 EXITERS_{it} + \gamma_1 \ln LP_{it} + \gamma_2 \ln L_{it} + \gamma_3 \ln (W/L)_{it} + \theta X_{it} + \pi_i + \rho_k + \varepsilon_{it} \quad \text{..... (2)}$$

where the dependent variable is the growth rate of labour productivity (a change in log of labour productivity between the two waves) and the other variables are as defined in Model (1).

Model (2) enables the estimation of firms' learning effects from exporting based on the previous export status or length of export, initial labour productivity and other firm characteristics. The pertinent issue is the extent of percentage change of a firm's productivity due to a change in export status. Specifically, the model is geared at

tracking firms that did not export in the first round of the survey but began to export in the second round of the survey (ENTRANTS) and the ones that exported in both waves (EXPORTERS). The mean labour productivity growth rates are compared with that of NON-EXPORTERS, which is a reference category. If only the ENTRANTS exhibit higher productivity growth relative to other firms, this means that improvement in firm productivity due to participation in international markets is only a short-lived effect. Alternatively, if EXPORTERS exhibit higher growth in labour productivity relative to other firms, then this means that firms learn continuously from exporting. The estimation also enables the tracking of productivity dynamics of firms that quit the export market (EXITERS) at any point in time.

The definition and measurement of model variables are given in table 6.

Table 6: Variable measurement and definition

Variable	Description
LP	Is a measure of labour productivity given as a ratio of value of sales per employee and expressed in log form (Baldwin & Gu 2003; Silvente, 2005).
Initial LP	Is the initial level of labour productivity (Alvarez & Lopez, 2005). This was included to control for self-selection of firms into exporting.
export	1 if a firm export (directly and/or indirectly), 0 if it sells domestically only (Baldwin & Gu 2003; Hansson & Lundin 2004; Mengistae & Patillo 2004; Ayadi & Mattoussi 2014).
foreign_owned	1 if a firm has foreign ownership i.e., if at least 10% of its stake is owned by private foreign individuals, companies or organizations, 0 otherwise (Demena & Murshed 2018; Cole et al. 2010)
firm_industry	1 if a firm is manufacturing, 0 otherwise
firm_age	number of years the firm has been in operation (see Mengistae & Patillo 2004; Alvarez & Lopez 2005; Silvente* 2005; Demena & Bergeijk, 2019). This variable was included to control for self-selection into exporting on top of also being productivity growth influencer (Newman et al., 2016a)
labour (L)	number of permanent and full-time employees working for the firm (Bernard & Jensen 1999, 2004; Silvente, 2005; Hansson & Lundin 2004; Mengistae & Patillo 2004).
average_wage(W/L)	total wages divided by employees and expressed in log form (Bernard & Jensen 1999, 2004; Hansson & Lundin 2004).

Before estimating the effects of export on firm performance, one of the empirical concerns is to check if there is high correlation among regressors. The measurement of degree of collinearity among regressors was checked using the pairwise correlation matrix. The results (as presented in Table A2 of the Appendix) indicates that none of the regressors' pairwise correlation was in excess of 0.8 in absolute terms, which implies that multicollinearity is not a serious problem for the sample data (Gujarati et al., 2012).

Results and Discussion

The results of correlation estimation between exporting and labour productivity are presented in Table 7. The Hausman test was performed to check if the coefficients of the Fixed Effects (FE) Model were statistically significant different from those of the Random Effects (RE) Model. The results are presented in Table A3 of the Appendix. The Hausman test results indicate that there is a statistical significance difference between FE and RE coefficients in favour of the FE Model. However, for reference purposes we report both results for FE and RE models given the advantage the latter has, in that it accounts for time invariant variables, such as comparison of results across countries.

The results (Table 7) indicate a positive coefficient of export dummy variable for both FE and RE specifications, as expected. The coefficient of the export variable is not statistically significant for the FE model although it was in favour of the Hausman test. On the other hand, the export variable coefficient is statistically significant for RE specification, indicating that exporting firms are more productive (by about 27%) than non-exporting firms. We checked for robustness of export premium, followed by mapping of the export pattern between continuous exporters (EXPORTERS), new exporters (ENTRANTS) and firm that quit the export market (EXITERS). The results indicate that both new and continuous exporters are more productive than non-exporters as their coefficients are positive and well determined. Continuous exporters are about 35% more productive than non-exporters whereas new exporters are about 27% more productive than non-exporters. The coefficient of EXPORTERS is greater than that of ENTRANTS, which indicates that continuous exporters are more productive than new exporters or that export productivity premium tend to accumulate with years of exporting. These results are more-or-less consistent with Newman et al. (2016a), who found evidence of accumulation of productivity with export experience among domestically owned firms in Vietnam.

The findings from both estimations clearly demonstrate that there is an export productivity premium for firms selling in foreign market, thereby supporting the findings presented in Table 3 for Model 1. On the other hand, there is no productivity difference between firms that were previously exporters (EXITERS) and continuous non-exporting firms.

Furthermore, the results in Table 7 indicate that foreign owned firms are more productive than government owned firms. Similarly, labour productivity increases with years of business experience, size of firm and average wage for the RE model specifications.

Table 7: Regression results of export premium

Variable	Export Dummy		Export Pattern
dependent: ln(LP)	**FE**	**RE**	**RE**
export	0.162	0.272*	
	(0.1220)	(0.1620)	
EXPORTERS			0.353**
			(0.1630)
ENTRANTS			0.270***
			(0.0579)
EXITERS			0.276
			(0.3020)
foreign_owned	0.365	0.595***	0.590***
	(0.1910)	(0.1470)	(0.1530)
firm_age(ln)	-0.541	0.156*	0.152*
	(0.3510)	(0.0917)	(0.0896)
labour(ln)	-0.0263	0.116*	0.110*
	(0.0609)	(0.0600)	(0.0565)
average_wage(ln)	0.563***	0.682***	0.677***
	(0.0762)	(0.0368)	(0.0370)
constant	5.067***	1.928***	1.947***
	(0.6530)	(0.0851)	(0.0965)
N	732	732	732
R-squared:			
within	0.3032	0.2771	0.2779
between	0.1634	0.5432	0.5431
overall	0.1924	0.4863	0.4879
Number of firms	437	437	437

Notes: Robust standard errors in parentheses clustered at country levels. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Industry dummy, year dummy and country dummies (for RE) were included but not reported.

The finding that exporting firms are more productive than non-exporting ones leaves one question unanswered. Do exporters learn from their exporting activity? In Table 8 we present results for mapping export patterns of firms between the two periods of survey to check if firms learn by exporting. The two main variables of interest are ENTRANTS and EXPORTERS, whose coefficients are positive, as expected (see Column 1). However, only the coefficient of ENTRANTS is statistically significant, which indicates that new exporters experience higher productivity growth than firms that decide to sell in the domestic markets only, which is in line with the learning by exporting hypothesis.

For new exporters, participation in foreign market increases their labour productivity by 32%. The findings, although not exactly similar, is within the range of those found in the literature. In Turkey, Yasar et al. (2006) found a 23% Total Factor Productivity (TFP) difference between new exporters and non-exporting firms. Similarly, Alvarez & Lopez (2005) found TFP productivity difference of about 40 percent for new exporting

firms in Chile. In Mozambique, Cruz et al. (2017) found a productivity difference ranging between 15% and 24% exporting and non-exporting firms.

The growth of labour productivity was found to be indistinguishable for continuous exporters and non-exporters as the coefficient of EXPORTERS was not statistically different from zero. In addition, the productivity growth rate of firms that exit foreign market (EXITERS) is not statistically different to those that sell in the domestic market only. The coefficient is negative, which is similar to findings by Hansson and Lundin (2004). This could be interpreted that exiting the export market may be associated with a decline in productivity.

In column 2 of Table 8, the analysis seeks to determine if there is learning heterogeneity by firm ownership. To detect this, we include in the model the interaction terms of export patterns and firm ownership status variable, with domestically owned firms as the base category. The interaction terms therefore indicate the export differential learning effectiveness of foreign owned firms relative to domestic owned firms. The results show positive and statistically significant coefficients of level variables (i.e., EXPORTERS and ENTRANTS). This means that with the inclusion of interaction terms of firm ownership in the model, we are also able to find evidence of learning among continuous exporters. Furthermore, we find negative and statistically significant coefficients of interaction terms between EXPORTERS and foreign owned firms (*EXPORTERS x foreign_owned*) and ENTRANTS and foreign owned firms (*ENTRANTS x foreign_owned*). The interaction terms are statistically significant, which indicates that there is a difference in learning effects between domestic and foreign owned firms.

The marginal effect is obtained by adding the coefficient of interaction term to that of the level variable. For continuous exporters, the difference in learning effects between domestic and foreign owned firms is 38%, indicating that continuous domestically owned exporting firms learn more from their export activities than foreign owned comparators. On the other hand, the learning effects difference between domestic and foreign new exporters is about 2%, which again indicates that new domestically owned exporters learn more from exporting relative to new foreign owned exporters. These results indicate that although generally domestic owned firms learn more from exporting relative to foreign owned firms, the effects accumulate with the period length in the exporting business. The findings that domestic owned firms learn more from exporting are corroborated by Sun and Hong (2011) on China firms, whereas the observation that learning effects tend to accumulative with years in exporting are consistent with those of Newman et al. (2016) for Vietnam firms.

The findings are in line with the theory of learning by exporting more likely due to the production technology gap between local owned firms in developing countries and firms in the countries of export destinations especially those in developed countries. The developed countries offer a possibility of learning effect through knowledge and technology diffusion as a result of feedback from and contact with foreign consumers

(Bernard and Wagner, 1997; Van Biesebroeck, 2005 and Harrison & Rodriguez-Clare, 2010). On the other hand, foreign owned firms might be producing using initially acquired advanced technology, such that participation in international market offers less learning platform, relative to the domestically owned firms.

Table 8: Learning by exporting regression results

Variable	***Learning Effect***	***Learning Heterogeneity***
Outcome: lnLP(sales)	**(1)**	**(2)**
EXPORTERS	0.352	0.742*
	(0.335)	(0.309)
ENTRANTS	0.320**	0.385**
	(0.0965)	(0.111)
EXITERS	-0.0328	-0.0728
	(0.0408)	(0.136)
foreign_owned	0.539**	0.888**
	(0.138)	(0.23)
Interaction Effects		
foreign_owned exporters		-1.123*
		(0.386)
foreign_owned entrants		-0.405**
		(0.113)
foreign_owned exiters		-0.0936
		(0.565)
Controls		
initial LP (ln)	-0.947***	-0.930***
	(0.052)	(0.0506)
firm_age(ln)	0.315***	0.315***
	(0.0251)	(0.0165)
labour(ln)	0.0383	0.0274
	(0.0364)	(0.0365)
average_ wage(ln)	0.292	0.259
	(0.171)	(0.173)
constant	2.851**	2.846**
	(0.546)	(0.546)
N	349	349
R-squared	0.41	0.419

***Source**: Authors' estimation from WBES data*

Notes:

Robust standard errors in parentheses clustered at country level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Industry dummy and country dummies were included but not reported. All independent variables were measured at the initial year the firm was observed.

Age is also found to have influence on labour productivity growth. That is, years of business experience increases the growth rate of labour productivity. Although we controlled for labour and average wage in both estimations, the results were not statistically significant.

To check for the robustness of the results, a similar model with export structures was estimated with the dependent variable measuring labour productivity from value added (Table 9). The results are consistent with those of Table 8, which largely are in line with the learning by exporting hypothesis. Similar to the results in Table 8, both coefficients for ENTRANTS and EXPORTERS were also found to be positive. There is also evidence of learning by exporting for new exporters, as the variable for ENTRANTS is statistically significant in the results of both Columns 1 and 2. Unlike the results in Table 8, average wage is statistically significant; however, age of a firm and number of employees were not significant.

Table 9: Robustness Check of Learning by Exporting

Variable	**Learning Effect**	**Learning Heterogeneity**
Outcome: lnLP(va)	**(1)**	**(2)**
EXPORTERS	0.136	0.176
	(0.117)	(0.144)
ENTRANTS	0.211*	0.256**
	(0.11)	(0.125)
EXITERS	0.11	0.0366
	(0.127)	(0.141)
foreign_owned	0.0406	0.0694
	(0.0928)	(0.15)
Interaction Effects		
foreign_owned exporters		-0.0942
		(0.216)
foreign_owned entrants		-0.176
		(0.26)
foreign_owned exiters		0.338
		(0.306)
Controls		
initial LP (ln)	-1.219***	-1.250***
	(0.162)	(0.164)
firm_age(ln)	0.0624	0.0568
	(0.0486)	(0.0492)
labour(L)	-0.0221	-0.0185
	(0.0328)	(0.0335)
average_wage (ln)	0.0824**	0.0800*
	(0.0412)	(0.0418)
constant	8.416***	8.642***
	(1.121)	(1.135)
N	173	173
R-squared	0.316	0.327

***Source**: Authors' estimation from WBES data*

Notes: *** p<0.01, ** p<0.05, * p<0.1. Country dummies were included but not reported. All control variables were measured at the initial year the firm was observed.

Concluding Remarks

Summary of the study

The relationship between international trade and firm performance has attracted the interests of researchers and policy makers alike. This is because exporting firms are observed to have distinguishing performance features from those of non-exporting firms. In line with this, two hypotheses compete as possible reasons for such noticeable differences: One is that the best performing firms self select into exporting because selling in foreign markets is associated with entry costs, which favour high productivity firms. The other is that firms learn by exporting, which tend to be more inclined with firms in low-income countries. This study has tested the learning by exporting hypothesis using WBES data for four EAC countries (Tanzania, Kenya, Uganda and Rwanda) for two waves between 2006 and 2013.

The study conducted a correlation test between firm performance and export status using a t-test difference between exporters and non-exporters and estimation of regression models. The findings showed a statistically significant performance difference between exporting and non-exporting firms, indicating that there exists a premium for firms that sell in international markets, which is consistent with other studies in the literature. A t-test for two- sample difference showed that exporting firms tend to be more productive, are likely to be associated with foreign ownership and larger in size and pay higher wages relative to non-exporters. The main issue was whether exporters experienced higher labour productivity, which was also confirmed by the regression results. Using RE model, the labour productivity premium for exporters was 27%. Continuous exporters exhibit higher productivity of about 35% relative to new exporters (about 27%), which indicated that export productivity premium tend to accumulate with exporting experience.

To test whether firms learn by exporting, the study export patterns of sample firms on the growth of labour productivity. Both new and continuous exporters were found to exhibit higher labour productivity growth relative to firms that remain as non-exporters, which implies that exporting firms learn from their exporting activities. An alternative measure of labour productivity (from value added) at least for entering firms gave similar results.

The findings of this study share commonality with findings of several studies in the literature. The rationality behind these findings is that penetration of domestic firms in international trade affords them the technical-know-how and opportunity for technological diffusion due to contact and feedback from foreign buyers. Furthermore, the size of the domestic market is always small and limited by the growth of local incomes, whereas expansion through exporting to include sales in foreign markets enables firms to benefit from the economies of scale and become low-cost producers, which in turn improves their competitive position in the markets (Isgut, 2001; Van Biesebroeck, 2005).

With regard to heterogenous learning between domestic and foreign owned firms, the learning effects among domestically owned exporters is more pronounced than among foreign owned exporters, whereby the former stand to benefit more as their experience in the export markets increases, which is similar to findings in other empirical studies. These findings confirm the earlier observation that continuous exporters are more productive than new exporters.

The conclusion drawn from these findings is three-fold; (i) firms in the countries under investigation learn by exporting; (ii) learning effects accumulate with experience in export market participation; and (iii) domestic owned firms learn more from exporting than foreign owned firms.

Policy implications

The findings from this study provide key policy messages to geared at boosting the growth of the EAC economies through promotion of exports. Since the findings indicate that exporting is an integral factor for the prosperity of these economies, export-led economic growth calls for promoting as many firms as possible, to penetrate in the foreign market. As Bigsten et al. (2004) and Rankin et al. (2006) put it, as the market for these economies is small and given their desire to industrialize, they can only achieve that through promotion of exports. Selling in the domestic market only constrains the growth of firms to the extent of the growth of local incomes, which have not progressed as anticipated over the past two decades. This means that beyond trade liberalization from 1980s, the economies need to formulate more reforms, which would push a number of domestic firms to participate in foreign markets, in line with the success story of the East Asian economies (Westphal, 2002 and Belloc & Di Maio, 2011). Export enhancing complementary reforms include microeconomic (direct support to current and potential exporters) and macroeconomic (functional for the whole economy). We suggest the following export promotion policies that have proven to have positive impact in other developing countries (Belloc & Di Maio, 2011):

i. Promotion of export processing zones (EPZs) activities, whereby China in Asia and Mauritius in Africa serve as leading examples. EPZ is one form of Special Economic Zones (SEZs) which consists of a designated industrial area within a country for purposes of supporting domestic manufacturing firms to export their products by providing them with benefits and exemptions.
ii. Improving access to credits, such as the establishment of special bank to support exporters. Such loans are more effective the longer is the repayment period and the lower are the rates. They are useful in financing fixed and working capital for domestic manufacturing firms.
iii. Establishment of export promotion agencies (EPAs), which work to influence information access to domestic manufacturing firms with the aim of increasing the volume and diversification of exports. They have an advantage in that their ownership can be by state or private or under public private partnership (PPP).

Countries that have managed to use EPAs successfully to promote export include South Africa, Chile, Costa Rica, Argentina, Uruguay and Peru.

iv. Lifting of trade barriers (as a way of promoting trade openness) and compliance with foreign standards of sanitary and quality (Van Biesebroeck, 2005).

v. Continue efforts to promote conducive investment climate, e.g., investment in physical and human resources, enabling access to information, improving access to credits, promotion of investment in R&D, removal of export bureaucracy, simplification of customs procedures, etc.

Suggestions for further research

The unavailability of recent annual panel dataset to trace the productivity changes over a longer period constrained this study. Longer panel dataset is more preferable as it enables the use of rigorous dynamic panel models such as difference or system GMM. The data for our study spanned the period of between five and seven years, which could not capture information of the export pattern for the time between the waves. Furthermore, due to limitation of data, other countries in EAC (Burundi and South Sudan) could not be included. As data becomes available, the extended study may incorporate these countries as well. Furthermore, future studies may extend into assessing whether exporting has non-diminishing impact on productivity.

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Appendix

Table A1: Probability of sample attrition: Marginal effects after probit regression

Variable	Probability
LP(ln)	-0.0292
	(0.0295)
export	0.0477
	(0.239)
foreign_owned	-0.103
	(0.0871)
labour(ln)	-0.222***
	(0.0331)
average_wage(ln)	-0.00278
	(0.0247)
firm_age(ln)	-0.0635
	(0.0458)
Dummy_Uganda	5.813***
	(0.229)
Dummy_Tanzania	6.107***
	(0.225)
Dummy_Kenya	6.711***
	(0.227)
Constant	-4.565***
	(0.305)
N	**1,584**

Source: Authors' estimation from WBES data

Note: Levels of significance: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors (in parentheses) are clustered at country levels. The regressors for the attrition model were taken from the first round of survey.

Table A2: Correlation Matrix

	export	foreign owned	firmage	labour(L)	average wages	kenya dummy	uganda dummy	rwanda dummy	industry dummy	year dummy
export	1									
foreign_owned	0.2362	1								
firmage	0.2332	0.0795	1							
labour(L)	0.2899	0.0787	0.1868	1						
average wage	0.1714	0.1567	0.1487	0.0989	1					
kenya_dummy	0.1509	-0.0303	0.1376	0.1548	0.2326	1				
uganda_dummy	-0.0598	0.0894	-0.0365	-0.0974	-0.3227	-0.4342	1			
rwanda_dummy	-0.0570	0.0002	-0.2537	-0.0367	0.0381	-0.1580	-0.2677	1		
industry_dummy	0.2626	-0.0061	0.2342	0.1270	0.0745	0.0307	-0.0418	-0.1398	1	
year_dummy	0.0981	-0.0633	0.3594	0.0754	-0.0182	-0.0071	-0.0717	0.0159	0.0364	1

Source: Authors' estimation from WBES data

Table A3: Hausman test of coefficient difference between FE and RE

	Export Dummy	**Export Pattern**
Chi2	23.17	21.49
Prob>Chi2	0.0016	0.0015
Decision	FE is preferred	FE is preferred

Source: Authors' estimation from WBES data