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Original article

Export market destination and performance: Firm-level evidence from Sub-Saharan Africa☆

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Abstract

This paper uses a novel manufacturing firm-level survey data in 19 sub-Saharan African (SSA) countries to explore the linkages among a number of export-market destinations (e.g., China, India, other Asia, EU, US, MENA, SSA excluding South Africa, and South Africa) and performance. The paper also examines differences between exporters and non-exporters performance and assesses self-selection. We find superior characteristics of exporters relative to non-exporters. Size, foreign ownership and past export experience enhance the propensity to export while continuing exporters outperform switching ones. Export destination matters: exporting to China leads to improvements in total factor productivity (TFP); India destination enhances the wage rate, labour productivity and TFP, while the South Africa destination depresses capital intensity. Furthermore, the study finds that export intensity matters for certain destinations, with higher levels of exports to the USA improving enterprise performance, such as increases in overall output and labor productivity, while the reverse holds for exports to other SSA countries. This latter finding clearly poses a challenge to efforts to increase intra-Africa trade. These findings should provide coherent and coordinated strategies for SSA policies seeking to promote economic development through exporting and diversification of trade partners.

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1. Introduction

The last two decades have seen a significant policy shift in sub-Saharan Africa (SSA), from inward-looking import substitution to outward-looking, market determined strategies. The reasons for

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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 fact, outward orientation has been held up as a potential source of growth booms for SSA economies. At a macroeconomic level, export is a means to generate foreign currency inflows required to finance imports as well as social development projects. At a microeconomic level, many arguments in favour of the export-market participation have been put forward. The participation in foreign markets is thought to improve firms' efficiency through three major channels. First, the larger international market allows the exploitation of economies of scale that raises productivity. Second, international contacts foster a learning process through technology and knowledge spillovers (Clerides et al., 1998; Baldwin and Gu, 2003). Third, and as argued by Bernard and Wagner (1997), another link running from exporting to success stems from the more nebulous notion of international competition. Here, increasing export intensity leads to increased management efficiency due to competition abroad.

Several studies have examined the relationship between exporting and enterprises performance (see e.g. Aw and Hwang, 1995; Bernard and Jensen, 1999; Girma et al., 2004; Hansson and Lundin, 2004; Greenaway and Yu, 2004). Regardless of the data examined and methodology used, these studies find that exporters are more productive compared with non-exporters. There are two competing hypotheses regarding this result. First, enterprises self-select to become exporters, i.e., they are more productive before they enter export markets. Hence, exporting involves sunk costs and greater productivity is required of enterprises that become exporters.¹ The self-selection hypothesis is addressed empirically by looking at performance characteristics in the period prior to exporting using an export premium measure. The second hypothesis is that better performance of exporting enterprises may arise from the exporting process itself, through a type of 'learning by exporting' experience. The case-study evidence (e.g. Crespi et al., 2008) suggests that firms learn about new techniques and methods from the experience of exporting. The learning-by-doing hypothesis is addressed empirically by looking at performance characteristics of exporters compared with non-exporters in the period following their entry into export markets, again using an export premium measure.

Empirical investigations of the links between exporting and enterprise performance in SSA have emerged (see e.g. Zeufack, 2002; Söderborn and Teal, 2003; Bigsten et al., 2004; Van Biesebroeck, 2005; Rankin et al., 2006). However, and to the best of our knowledge, almost nothing is known about the relationship between export-market destination and the performance characteristics of SSA manufacturing firms. Yet, export-market destination matters. As noted by Ruane and Sutherland (2005) and Eaton et al. (2011), exporting 'globally' to unfamiliar markets where social, economic, and legal structure are different from those normally faced may really be what exposes the enterprise to competitive pressures and greater learning opportunities. Furthermore, export destination in relation to performance characteristics of enterprises is an important empirical question for informing SSA policies that seek to promote growth through exporting and diversification of trade partners, but without a coherent and coordinated strategy.

In sum, research on exports and enterprise performance has mainly been confined to the developed countries, Latin American and Asian countries but much less in the case of SSA countries. Yet, outward orientation and efficiency gains are of particular interest in SSA where the governments have adopted the export-led growth approach as their main development strategy, and juggle multiple trade partners without a clear vision. Moreover, one element of export behaviour of SSA manufacturing firms not discussed widely in the literature relates to the role of export destination. Our analysis is centred on three

¹ Export entry is costly. As a result firms with higher ex-ante productivity self-select into export markets, while those with lower productivity produce for the domestic market. For theoretical and practical explanations of why enterprises self-select to become exporters see, for instance, Jean (2002), Melitz (2003), Medin (2003), and Helpman et al. (2004).

questions. First, do exporting enterprises exhibit evidence of superior performance relative to non-exporters? Second, if so, what are the sources of the relatively good performance traits of exporting firms? Finally, does the export market destination matter? The first two questions have been previously addressed by others. The last question constitutes the main contribution of the current paper.

In this paper we use a novel manufacturing firm-level survey dataset of 2009 in 19 SSA countries and the main findings of the paper are the following. SSA manufacturing firms that export differ from those that do not along a variety of dimensions: they are larger as measured by employment and output, more productive, more capital intensive, and pay higher wages. Moreover, foreign ownership and past export experience enhance the propensity to export, while continuing exporters outperform switching exporters. Coming finally to the role of export-market destination in the relationship between enterprise performance and exporting, three basic pieces of evidence emerge from the dataset. Firstly, in terms of improvements in total factor productivity (TFP), China is an excellent destination. Our estimates suggest that firm-level TFP increases by 0.21% for each 1% increase in China's export intensity. Secondly, exporting to India enhances the wage rate, labour productivity and TFP. Quantitatively, a 1% increase in the share of output exported to India increases the wage rate, labour productivity and TFP by 0.28%, 1.03% and 0.11%, respectively. Thirdly, the South Africa export-market destination impedes capital intensity, i.e., a 1% increase in the share of output exported to South Africa decreases the capital/labour ratio by 0.60%. Finally, the scale of exporting, and not merely the export destination pattern, influences the success of exporters.

The rest of the paper is organized as follows. In [Section 2](#), we outline the empirical model. In [Section 3](#), we describe the main characteristics of the data and present some basic evidence on the magnitude of performance differences between exporters and non-exporters. In [Section 4](#), we provide empirical evidence. The concluding remarks are provided in [Section 5](#).

2. Methodology

First, we provide evidence on the magnitude of the performance gap between exporters and non-exporters for a variety of firm attributes. To measure the export premium, if any, we follow the methodology introduced by [Bernard and Jensen \(1995\)](#) and [Bernard and Wagner \(1997\)](#). The model searches for an export premium, as a measure of the superiority of exporters relative to non-exporters, in terms of firm characteristics and performance. Our general estimating equation takes the following form:

$$y_i = \alpha + \beta_1 E_i + \beta_2 S_i + \beta_3 D_j + \beta_4 D_r + \varepsilon_i \quad (1)$$

where i , j , and r index firms, industries and regions, respectively, and y denotes the log of the performance characteristics examined to determine if there is a premium between exporting and non-exporting firms: capital intensity, output (sales), wages, labour productivity (value added per employee), and TFP. The premium is captured using a dummy variable, E_i , to reflect the current export status of the firm (0 for non-exporter, 1 for exporter). The literature has been particularly interested in the coefficient on E_i . The rationale behind this specification is that exporting leads to better performance. The export premium coefficient (β_1) thus captures the average percentage difference between exporters and non-exporters in the same industry and country. In particular, the export premium is computed from the estimated coefficient β_1 as, $100(\exp(\beta_1) - 1)$ (see [Wagner, 2007](#)). S_i is the dummy variable for size that takes the value of one when the number of employees is above the median employment level across all firms in each industry and country, zero otherwise.² D_j and D_r represent the respective full sets of two-digit industry and region dummies, so that any effect common to industries and regions is controlled for, and ε_i is random error term.

² The sample median employment is 45.

We also investigate whether export intensity makes a difference. For that we employ the specification that allows for an export premium that varies with export intensity. In particular, we consider the following specification:³

$$y_i = \alpha + \beta_1 E_i + \beta_2 ES_i + \beta_3 S_i + \beta_4 D_j + \beta_5 D_r + \varepsilon_i \quad (2)$$

where ES_i is the share of exports in total output. We use fixed effects regression techniques to estimate (1) and (2) separately for each of the five enterprise performance characteristics.

The previous development will help provide evidence on whether exporters perform better than non-exporters. We pursue this issue further and perform an analysis of the determinants of export behaviour. Following Sterlacchini (2001), Castellani (2002), and Girma et al. (2004), we perform both a test on the determinants of the probability of exporting and of the intensity of exporting activity. We model the export behaviour of a firm specifying the following PROBIT equation for the probability of being an exporter:

$$p_i = \alpha + \beta_1 S_i + \beta_2 W_i + \beta_3 TFP_i + \beta_4 OW_i + \beta_5 PE_i + \beta_6 AG_i + \beta_7 D_j + \beta_8 D_r + u_i \quad (3)$$

In Eq. (3) the dependent variable takes the value of 1 if a given firm was exporting in 2009 and zero otherwise. The explanatory variables are the firm size (S_i) proxied by the dummy variable for size that takes the value of one when the number of employees is above the median employment level across all firms in each industry and country, zero otherwise; TFP_i ; the cost of labour per worker (W_i); the ownership status of the firm (OW_i) measured using a dummy variable which equals 1 for foreign firms and 0 for indigenous firms⁴; previous exporting experience (PE_i) measured using a dummy for whether the firm exported in the previous year in order to capture the effects of persistence in export behaviour; and the age of the firm (AG_i). The error term is u_i . Regarding the use of an appropriate econometric method, in Eq. (3) the dependent variable is a (0/1) dummy suggesting a discrete response model. In fact, we use the PROBIT regression. The dependent variable in Eq. (3) is also measured using the export intensity defined as a variable between 0 and 1. The popular approach here is the TOBIT regression, i.e., the TOBIT model is used because the dependent variable (export intensity) is quantitative and limited. But, for the purpose of comparison we also use the LOGIT model. Wagner (2001) and Castellani (2002) noted that the TOBIT estimation method is not designed for variables which by definition are bounded between 0 and 1. Therefore, a more appropriate model is the quasi-likelihood estimation method (QLM) for fractional responses developed by Papke and Wooldridge (1996).⁵

The third issue to be examined in the paper is associated with the impact of export behaviour on the performance characteristics of enterprises. The UNIDO sample allows a classification of firms according to their trajectories in the domestic and export markets over the period 2006–2010 into four groups: continuing exporters, non-exporters, entering exporters, and exiting exporters. In particular, we address the question of whether more productive firms become exporters (an empirical model of self-selection in export markets). To examine the relationship between the exporting and subsequent enterprise performance, we follow previous literature (see e.g. Farinas and Martin-Marcos, 2007) and estimate the following equation for each of the performance characteristics in levels,

$$y_i = \alpha + \beta_1 CX_i + \beta_2 SW_i + \beta_3 Z_i + \beta_4 D_j + \beta_5 D_r + \varepsilon_i \quad (4)$$

³ See e.g. Bernard and Wagner (1997) and Girma et al. (2004) for a similar approach.

⁴ In the UNIDO (United Nation Industrial Development Organization) dataset, foreign owned firms are defined as firms in which foreign ownership is 50% of total equity.

⁵ The QLM estimates will be obtained using the Stata command – glm – with the following option: family(binomial), link (logit), robust. See Castellani (2002) for details.

where y_i is the level of the performance characteristics of enterprises.⁶ CX_i is a dummy variable equal to 1 if the enterprise exported continuously (export persistence) and 0 otherwise. SW_i is a dummy variable equal to 1 if the enterprise switched export status, whether the enterprise entered the export market or exited from it. In particular, the dummy variable takes the value 1 if the enterprise either entered or exited the export market. Hence, it does not distinguish between the two, but simply defines those enterprises that ‘switched’ export status. The coefficients β_1 and β_2 thus capture the increase in growth rates of performance characteristics for exporting and switching enterprises, respectively, relative to those that remained non-exporters. Z_i is a vector of enterprise characteristics e.g. (i) a dummy variable for size (this dummy variable is equal to 1 if the enterprise employment is greater than 45), (ii) a dummy variable indicating if the enterprise is owned by foreigners, and (iii) the R&D intensity variable. D_j and D_r are as previously defined. Eq. (4) will be estimated separately for each of the enterprise characteristics using standard cross-section regression techniques.

The last issue to be explored is related to the connection between export destination and intensity premium. As UNCTAD (2002) notes, successful exporting involves more than just increasing international market shares, because greater export diversification, reflected by changing export destinations, could be an indication of the improved export propensity of enterprises. Moreover, and as argued by Ruane and Sutherland (2005), by incorporating export destination patterns and intensity into the analysis of export premia, account is taken of important components of the export behaviour of enterprises.

In sum, the number and type of export destination markets to which enterprises ship their output can be viewed as proxies for the strength of export activity. This issue is of considerable interest to SSA countries, as their export promotion strategies attempted to expand exports beyond the traditional and primary destination, the EU market. Following the methodological approach established by Ruane and Sutherland (2005),⁷ and restricting the regression sample to the firms that exported in 2009, the estimating equation takes the following form:

$$y_i = \alpha + \sum_{i=1}^9 \beta_i ED_i + \gamma ES_i + \delta_1 Z_i + \delta_2 D_j + \delta_3 D_r + \varepsilon_i \quad (5)$$

where y_i is defined as in Eq. (4), ED_i is the proportion of exports shipped to various destinations. For instance, if $\beta_i > 0$, then exporters to a specific market destination have superior performance characteristics. ES_i is the share of exports in enterprise output, and captures the expected premium accruing to enterprises that export more intensively than others. As before, we control for enterprise characteristics (the ‘Z’ variable) e.g. size, age, foreign ownership, R&D intensity as well as sector and region effects. For each export market destination, we use the seemingly unrelated regression model (SURE) of Zellner (1962) which allows us to simultaneously estimate the five equations linked to the five attributes of performance.

3. Data description

Our analysis draws on survey data recently collected by the UNIDO based on a common questionnaire applied to manufacturing firms in 19 SSA countries in 2009.⁸ Table 1 Panel A provides

⁶ Unfortunately, the UNIDO (2009) dataset contains information on the growth rate of the performance characteristics such as employment and output.

⁷ However, we extend their analysis by exploring various export-market destinations.

⁸ More information on the survey can be found at <http://www.investment.unido.org/imp>. These countries are: Burkina Faso, Burundi, Cameroon, Cape Verde, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Mali, Mozambique, Malawi, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, and Zambia.

summary statistics for exporting and non-exporting firms. On average exporting firms are larger than non-exporting firms, employing 263 and 90 workers, respectively.⁹ SSA manufacturing firms that export are more capital intensive than non-export firms. Exporting enterprises are also larger in terms of average gross value added. For example, the group of exporting firms accounts for 78.6% of the output of SSA manufacturing, which means that exporters are bigger than non-exporters. Exporting enterprises equally pay higher wages than non-exporting firms. It also seems that exporters are on average more productive than non-exporters in terms of both value added per employee and TFP. For example, the value of gross value added produced by each employee for exporters is 4.1% higher than the industry mean, whereas that for non-exporters is 2% below. Likewise, the mean level of TFP is 4.8% above the industry mean for exporting firms and 6.8% below for non-exporting firms. At the median, the average level of TFP is 1.8% above the industry mean for the export group and 1.1% below for the non-export group.

Regarding the other characteristics, such as the R&D intensity, exporters have a higher R&D effort measured in terms of the ratio of R&D expenditures to value added. R&D effort is almost two times greater for exporters with respect to non-exporters in 2009. In particular, R&D effort is on average 2.8 points higher for exporting firms. Looking at firm age, once again we observe systematic differences between exporters and non-exporters and the average age difference is four years. With respect to foreign ownership, the degree of involvement of foreign-owned firms in the population of SSA manufacturing firms is high. The percentage of firms with a majority of foreign capital participation is greater in the group of exporting firms (nearly 56.8% of firms) whereas in the group of non-exporters, the rate of participation is approximately 29.4%. Pairwise t tests suggest that all of these indicators differ significantly between the two samples except in the both cases of labour productivity and R&D intensity. Summarizing, the raw data suggest a strong relationship between exporting and performance.

Table 1 Panel B shows that the proportion of exporting enterprises is nearly 31% and their corresponding export intensity is around 46%. Table 1 Panel C finally details the shares of output exported by SSA manufacturing firms to various destinations. The SSA destination has the lion's share: approximately 36.9% of SSA manufactured exports are shipped within the SSA region. The historical economic ties and trade agreements (e.g. African Growth and Opportunities Act - AGOA with the US and Cotonou Agreements/Economic Partnership Agreement with the EU) have possibly given SSA enterprises relatively greater trade access to EU and US markets. For example, around 17.7% (with a corresponding export intensity of 40.8%) and 13.1% (with a corresponding export intensity of 10.7%) of SSA manufactured goods are exported to EU and US markets, respectively. In the remaining six export destinations of SSA enterprises, the proportion of exports shipped ranges from "other destinations" at 15.5% to India destination at 2.7%.

Firms' characteristics by export-market destination are shown in Table 1 Panel D. The average firm size ranges from 215 employees in SSA exporters to 554 in US exporters. It is clear from the standard deviations that the size range is quite large. MENA, India and "other Asia" exporters have a higher level of capital intensity than exporters to the remaining export-market destinations. The activity of exporting internationally and within the SSA region is mainly dominated by older and foreign-controlled firms. The average firm age ranges from 27 years in "other destinations" exporters to 21.5 years in US exporters, whereas the average foreign ownership varies from 62.7% in India exporters to 51.8% in EU exporters. SSA manufacturing firms exporting to MENA and 'other destination' invest more in R&D (on average 11% and 9.8% of value added, respectively). In the

⁹ The median average employment in non-exporting firms is 35, whereas for exporting firms it is 95. The fact that the median lies below the mean suggests the distribution of employment is skewed in both the sample of exporting and non-exporting firms, with dominance by smaller firms. But, the small-firm dominance is higher in non-exporting firms.

remaining export-market destinations, the share of R&D expenditures in value added ranges from 7.9% in ‘other Asia exporters’ to 4.7% in US exporters.

4. Results

4.1. Estimates of export premium

Results from the specifications (1) and (2) are given in Table 2 Panels A–B. After controlling for size, and sector and region-specific effects, we find in Panel A that exporting is positively and significantly related to all our measures of enterprises performance. On average, SSA exporting enterprises are 95.2% larger than non-exporters in terms of output. African exporting firms are also more productive than their non-exporting counterparts. Measured either in terms of labour productivity or TFP, exporters have higher productivity. On average, the difference in labour productivity is 48.6% and the difference for TFP is 16.1%. Likewise, SSA exporting enterprises are more capital intensive and pay on average higher wages than SSA non-exporters. Specifically, the capital-labour ratio of a typical exporting enterprise is 44% greater, and workers in exporting enterprises appear to benefit from higher wages by about 14.9%. Furthermore, as already stated, the estimated 44% capital intensity advantage and 15% wage premium of exporters over non-exporters are significant beyond the 99% level. Our results echo those reported elsewhere (e.g. Bernard and Jensen, 1995 for the US; Bernard and Wagner, 1997 for Germany; Isgut, 2001 for Colombia), namely, that the performance characteristics of exporters and non-exporters are remarkably different, but contrast with those of Girma et al. (2004) who find no significant difference in performance between exporters and non-exporters.

Overall, the results presented in Panel A Table 2 confirm the existence of substantial differences between SSA exporters and non-exporters. The indicators of economic performance such as capital intensity, size wage and productivity are greater in exporting enterprises.

The relationship between export intensity and firm performance characteristics is given in Table 2 Panel B. While the average exporter is more likely to be capital intensive, more productive as measured by value added per employee and TFP, firms with high export shares seem less likely to be capital intensive and productive. However, the effect is significantly different from zero only in the capital intensity and TFP equations. For example, the capital-labour ratio drops 3.6% for each 10% increase in export intensity. Likewise, the level of TFP drops 2.1% for a similar increase in the share of exports to total output. Output and wage rate rise as export intensity increases although the 0.8% increase in output as well as 0.7% increase in the wage rate following each 10% increase in export intensity are not significantly different from zero at any conventional level.

4.2. Determinants of exporting

The results from PROBIT regressions are presented in Table 3. All coefficients reported in this table are changes in the marginal probability evaluated at the mean of the regressors.¹⁰ They indicate the following. As expected, the probability of exporting is increasing in the size. In quantitative terms, for a unit change in the firm’s size the probability of exporting increases by 15.2%. This result is consistent with the general belief that firms should be relatively larger in size in order to be successful in foreign markets. Wagner (1995:33) points out various reasons why firms should be large in size in order to compete in the global market: ‘... economies of scale in production, a more fully utilization of

¹⁰ The marginal effects are calculated using the ‘*mf*’, *nodiscrete*’ command in STATA.

(specialized) executives, the opportunity to raise financing at lower costs benefits from bulk purchasing, own marketing department plus own sales force, and a high capacity for taking risk...’.

Moving to the other explanatory variables, the probability of exporting increases with the efficiency of the firms (the TFP measure). The type of ownership also influences the probability of

Table 1

Characteristics and export-market participation of SSA manufacturing enterprises.

Panel A: Characteristics of SSA manufacturing enterprises					
Variable	Non-exporting enterprises		Exporting enterprises		Mean <i>t</i> -test ^a
	Mean	Standard deviation	Mean	Standard deviation	
Employment	90	229	263	532	12.26 (0.000)
Capital intensity	37,301.97	440,493.90	163,559.90	2,717,990.00	2.02 (0.044)
Wage rate	2540.97	4460.75	3509.53	5372.69	4.96 (0.000)
Value added	4,356,245.00	5.23e+07	8,716,899.00	3.38e+07	2.17 (0.030)
Labour productivity	46,885.87	530,079.60	49,809.79	266,467.70	0.15 (0.882)
TFP ^b	2.297	0.960	2.448	1.027	3.53 (0.000)
R&D intensity	0.035	0.422	0.063	0.393	1.50 (0.134)
Age	18.594	15.085	22.926	17.731	6.91 (0.000)
Foreign ownership	0.277	0.448	0.540	0.499	14.45 (0.000)

Panel B: Export features of SSA manufacturing enterprises

Number of enterprises	3064
Proportion of exporting enterprises (%)	30.74
Export intensity of enterprises (%) ^c	46.14

Panel C: Export destination of enterprises

Export-market destination	Total exports by destination (%)	Export intensity by destination (%)	Proportion of exporting enterprises by destination (%)
China	3.89	1.41	4.27
India	2.65	0.85	4.41
Other Asia	3.91	0.96	4.87
European Union (EU)	17.74	40.76	16.90
US	13.12	10.69	11.18
MENA	3.17	9.48	5.06
Other destinations	15.46	1.76	8.09
SSA (excluding South Africa)	36.87	31.25	36.55
South Africa	3.17	2.85	8.68

Panel D: Firms characteristics by export-market destination

Export-market destination	Employment	ln(capital/employment)	Firm age	Any foreign ownership	R&D intensity
China	453.078 (761.386)	9.877 (1.818)	26.415 (22.981)	0.523 (0.503)	0.050 (0.332)
India	429.075 (751.918)	10.134 (1.820)	25.567 (21.143)	0.627 (0.487)	0.070 (0.355)
Other Asia	345.622 (641.126)	10.064 (1.820)	24.041 (18.603)	0.541 (0.502)	0.079 (0.364)
European Union (EU)	332.422 (581.371)	9.352 (1.914)	22.342 (18.196)	0.518 (0.501)	0.067 (0.375)
US	554.254 (751.144)	8.942 (2.136)	21.488 (19.556)	0.609 (0.489)	0.047 (0.256)
MENA	353.961 (749.892)	10.178 (1.867)	25.143 (19.264)	0.545 (0.501)	0.110 (0.462)
Other destinations	356.504 (749.892)	9.833 (2.204)	26.771 (18.973)	0.569 (0.497)	0.098 (0.510)
SSA (excluding South Africa)	214.495 (436.640)	9.840 (1.624)	25.659 (19.474)	0.547 (0.498)	0.070 (0.410)
South Africa	392.848 (822.552)	9.104 (2.039)	25.212 (19.868)	0.598 (0.492)	0.076 (0.342)

exporting. In particular, foreign-controlled firms are more likely to export by just over 9.8% compared to indigenous firms. Not surprisingly, past export experience is very important in explaining the probability of current export behaviour. Indeed, SSA manufacturing firms that exported in the previous period are 1.1 times more likely to export than firms that did not. This is a very large increase relative to the 0.327 overall probability of exporting. The probability of a firm's decision to undertake R&D activities is higher for exporters as opposed to non-exporters. We find that the probability is 14.9% higher for exporters.

With respect to the intensity of exports, columns (2)–(3) report the LOGIT and TOBIT estimates while column (4) reports results obtained using the QLM method, respectively. Again, the reported coefficients are changes in the marginal probability evaluated at the mean of the regressors. Apart from the magnitude of the coefficients (which cannot be compared across the different methods), results using LOGIT, TOBIT and QLM approaches are quite similar and confirm the PROBIT estimates. However, the coefficient associated with TFP in columns (3) and (4) indicate no clear relationship with the export intensity. Moreover, the R&D intensity variable now has no statistically significant effect on the export intensity of SSA manufacturing firms.

Summarizing, the estimates show that the probability of exporting seems to be determined, to a large extent, by a firm's size and ownership status, and past export experience. Exporting intensity is similarly affected by these variables generally; however, it is adversely influenced by age.

4.3. Export behaviour and performance characteristics

In this section, we have estimated the empirical model of self-selection (Eq. (4)) in export markets. The results are shown in Table 4. The results show that persistence in the export market is associated with good outcomes for firms since all performance measures show significantly higher levels than switching exporters. For example, compared to switchers, capital intensity, output, wage rate, value added per employee, and TFP are 44%, 81.8%, 12.4%, 43.4%, and 16.2% higher, respectively. Overall, continuous exporters outperform switchers on every performance measure.

Unexpectedly, Table 4 also reports that R&D intensity reduces capital intensity, output, labour productivity and TFP. This perverse result may be simply a statistical quirk. Since most African firms innovate little, if at all, their R&D intensity (ratio of innovation expenditures to value added) is likely to be very low or does not exist in most cases, and the data may be simply unreliable. However, it is also quite possible that low-productive firms may engage in higher R&D as a catch-up effort.

4.4. Export destination and intensity premium

One of the main contributions of this paper is the introduction of export destination into the export premium literature. Therefore, this section aims at examining the influence of export market destination on firm performance. The paper covers nine export-market destinations to which the SSA

Notes to Table 1:

Source: Own estimates using the UNIDO (2009) dataset.

^a Absolute t-statistic with p-value within parentheses.

^b Let y_i denote the logarithm of output of firm i , and correspondingly, l_i , k_i , m_i , and e_i are the firm's (log of) labour, capital, materials, and energy inputs. TFP is computed in the usual way: $\ln TFP = y_i - \hat{\beta}_l l_i - \hat{\beta}_k k_i - \hat{\beta}_m m_i - \hat{\beta}_e e_i$ for all i , where $\hat{\beta}_l$, $\hat{\beta}_k$, $\hat{\beta}_m$ and $\hat{\beta}_e$ are the OLS estimates (with standard errors corrected for heteroskedasticity – White correction) of the labour, capital, materials, and energy production function elasticities. Furthermore, the measures of TFP are generated using a regression that includes industry and region fixed effects.

^c Export intensity is defined as output exported as a proportion of total output.

Table 2

The premium to exporting in SSA manufacturing.

	Capital intensity	Output	Wage rates	Labour productivity	Total factor productivity
<i>Panel A: Export dummy</i>					
Export premium	0.440 *** (0.076)	0.952 *** (0.078)	0.149 *** (0.051)	0.486 *** (0.078)	0.161 *** (0.052)
Size	0.229 *** (0.065)	2.370 *** (0.069)	0.235 *** (0.042)	0.308 *** (0.070)	0.005 (0.044)
Sector dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
# observations	2885	2933	2756	2407	2384
R ² overall	0.176	0.481	0.209	0.184	0.069
<i>Panel B: Export intensity</i>					
Export dummy	0.582 *** (0.095)	0.924 *** (0.100)	0.121 ** (0.067)	0.547 *** (0.101)	0.243 *** (0.067)
Export intensity	−0.357 ** (0.176)	0.079 (0.173)	0.071 (0.100)	−0.153 (0.171)	−0.208 * (0.127)
Size	0.236 *** (0.065)	2.365 *** (0.069)	0.233 *** (0.042)	0.308 *** (0.070)	0.010 (0.045)
Sector dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
# observations	2885	2933	2756	2407	2384
R ² overall	0.178	0.481	0.209	0.185	0.071

Notes: The figures in parentheses are the heteroscedasticity-robust standard errors. The estimates of the fixed regional and sector effects are not reported.

*** Denotes significance at the 1% level.

** Denotes significance at the 5% level.

* Denotes significance at the 10% level.

manufacturing firms shipped shares of their output in 2009: China, India, Other Asia, EU, US, MENA, Other Destinations, SSA (excluding South Africa), and South Africa. The SURE estimates are reported in Table 5.¹¹

4.4.1. China destination

As the figures in Table 1 suggest, in 2009 4.3% of SSA exporters of manufactures shipped nearly 1.4% of manufactured products to China. Do these enterprises exhibit superior performance characteristics relative to enterprises that export to other markets? Panel (i) Table 5 presents the regression results. The coefficient of the China export destination variable is positive and significantly different from zero in the TFP specification. This result suggests that exporting to China is associated with a positive TFP. For a 1% increase in the share of China's exports in total output, the level of TFP of SSA enterprises would be expected to increase by 0.21%.

As regards the control variables, the results reported in Appendix Table A1 reveal that the coefficients associated with age and foreign ownership are both positive and statistically significant in the capital-to-labour ratio equation. These findings indicate that the capital intensity of SSA firms rises with increases in the age and with foreign ownership of enterprises. Similar results are obtained in the case of the output specification; in addition, the size variable is positively signed and statistically significant. In the labour productivity and TFP equations, the coefficients on size and foreign ownership (R&D intensity) are positive (negative) and significantly different from zero. These results indicate that increasing firms' size and foreign ownership yield improvements in the labour

¹¹ For the purpose of comparison across destinations for each attribute, we present only the results relevant to the role of export destination as well as export intensity. The results including all the variables are shown in the appendix Table A1. We thank the anonymous referee for suggesting this way of presenting the results on export destination.

Table 3

The determinants of exporting in SSA manufacturing.

Variable	Export dummy	Export intensity		
	PROBIT (1)	LOGIT (2)	TOBIT (3)	QLM ¹ (4)
Size	0.152 *** (0.054)	0.184 *** (0.065)	0.125 *** (0.040)	0.033 *** (0.014)
ln(wage rate)	−0.012 (0.022)	−0.013 (0.026)	−0.006 (0.012)	−0.003 (0.004)
Total factor productivity (TFP)	0.050 *** (0.020)	0.063 *** (0.025)	0.013 (0.015)	−0.0004 (0.004)
Foreign ownership	0.098 *** (0.039)	0.115 *** (0.045)	0.138 *** (0.024)	0.051 *** (0.009)
Past exporting	1.112 *** (0.065)	1.230 *** (0.104)	0.801 *** (0.054)	0.240 *** (0.010)
ln(age)	0.012 (0.029)	0.017 (0.036)	−0.068 *** (0.021)	−0.031 *** (0.008)
R&D intensity	0.149 *** (0.056)	0.167 *** (0.059)	0.044 (0.038)	0.006 (0.012)
Sector dummies	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes
# observations	1700	1700	1700	1700

Notes: The coefficients give the marginal effect of changing the independent variable evaluated at the mean. Standard errors clustered at the country level are in parentheses. The estimates of the fixed regional and sector effects are not reported. They are, however, available from the author upon request.

*** Denotes significance at 1% level.

¹ Here, the marginal effects are calculated using the ‘*margins, dydx(*)*’ command in STATA.

productivity of SSA enterprises while the reverse is true for the R&D intensity. As argued above, however, the R&D results are simply unreliable.

4.4.2. India destination

As far as the India export destination market is concerned, according to Table 1, in 2009 4.4% of SSA enterprises exported nearly 0.85% of their output to India. Panel (ii) Table 5 presents the regression results incorporating India export-market destination as a factor in the relationship between various aspects of enterprise performance characteristics and exporting.

Table 4

Performance characteristics of firms by export status.

Variable	Capital intensity	Output	Wage rate	Labour productivity	Total factor productivity
Constant	8.619 *** (0.657)	12.188 *** (0.722)	6.534 *** (0.527)	9.411 *** (0.353)	2.519 *** (0.244)
Continuing exporters	0.440 *** (0.089)	0.818 *** (0.088)	0.124 *** (0.055)	0.434 *** (0.084)	0.162 *** (0.046)
Switchers	0.181 (0.144)	0.556 *** (0.139)	0.100 (0.110)	0.094 (0.138)	0.100 (0.073)
Size	0.142 ** (0.076)	2.109 *** (0.075)	0.118 *** (0.047)	0.201 *** (0.075)	−0.083 ** (0.038)
Foreign ownership	0.386 *** (0.073)	0.804 *** (0.075)	0.283 *** (0.046)	0.609 *** (0.075)	0.161 *** (0.041)
R&D intensity	−0.205 *** (0.091)	−0.210 *** (0.072)	−0.029 (0.066)	−0.521 *** (0.073)	−0.197 *** (0.080)
Sector dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
# observations	2026	2075	1913	2077	1834
R ² overall	0.236	0.545	0.251	0.242	0.113

Notes: The figures in parentheses are the heteroscedasticity-robust standard errors. The estimates of the fixed regional and sector effects are not reported.

*** Denotes significance at the 1% level.

** Denotes significance at the 5% level.

Table 5

SURE estimates of export and market destination intensity premium of SSA exporters.

Variable	ln(capital intensity) (1)	ln(output) (2)	ln(wage rate) (3)	ln(labour productivity) (4)	ln(TFP) (5)
<i>(i) China destination</i>					
ln(China destination intensity)	−0.173 (0.583)	−0.020 (0.495)	−0.349 (0.698)	0.971 (0.653)	0.205 ** (0.099)
ln(export intensity)	−0.925 (0.989)	−0.643 (0.840)	−1.181 (1.183)	−0.508 (1.106)	0.038 (0.167)
<i>(ii) India destination</i>					
ln(India destination intensity)	0.234 (0.620)	0.203 (0.393)	0.283 ** (0.128)	1.031 *** (0.316)	0.111 *** (0.043)
ln(export intensity)	0.680 (0.679)	0.612 (0.430)	−0.010 (0.140)	−0.292 (0.346)	−0.143 *** (0.047)
<i>(iii) Other Asia destination</i>					
ln(other Asia destination intensity)	−0.379 (0.432)	0.030 (0.588)	−0.563 (0.383)	−0.144 (0.484)	−0.028 (0.058)
ln(export intensity)	−0.313 (0.654)	−0.140 (0.890)	−0.369 (0.579)	−0.877 (0.732)	0.080 (0.087)
<i>(iv) EU destination</i>					
ln(EU destination intensity)	−0.123 (0.156)	−0.213 (0.163)	0.014 (0.090)	−0.215 (0.151)	−0.019 (0.029)
ln(export intensity)	0.160 (0.191)	−0.095 (0.200)	0.119 (0.111)	−0.020 (0.185)	−0.045 (0.035)
<i>(v) US destination</i>					
ln(US destination intensity)	−0.253 (0.265)	−0.231 (0.267)	0.019 (0.142)	−0.079 (0.260)	−0.083 (0.055)
ln(export intensity)	0.741 ** (0.433)	0.956 ** (0.437)	0.127 (0.231)	0.840 ** (0.426)	0.045 (0.090)
<i>(vi) MENA destination</i>					
ln(MENA destination intensity)	0.021 (0.270)	0.069 (0.290)	−0.082 (0.090)	0.023 (0.183)	−0.018 (0.041)
ln(export intensity)	0.478 ** (0.279)	0.072 (0.301)	0.432 *** (0.094)	0.188 (0.189)	0.039 (0.042)
<i>(vii) Other destinations</i>					
ln(other destinations intensity)	−0.225 (0.308)	−0.032 (0.266)	−0.267 (0.185)	−0.093 (0.205)	0.011 (0.038)
ln(export intensity)	0.555 ** (0.314)	0.284 (0.271)	0.279 (0.188)	0.289 (0.209)	0.022 (0.038)
<i>(viii) SSA (excluding South Africa) destination</i>					
ln(SSA destination intensity)	0.086 (0.191)	0.160 (0.182)	0.079 (0.163)	0.071 (0.163)	−0.008 (0.032)
ln(export intensity)	−0.062 (0.121)	−0.217 ** (0.116)	−0.363 *** (0.104)	−0.363 *** (0.104)	−0.065 *** (0.020)
<i>(ix) South Africa destination</i>					
ln(South Africa destination intensity)	−0.595 *** (0.258)	0.011 (0.299)	−0.112 (0.127)	−0.043 (0.275)	0.057 (0.036)
ln(export intensity)	0.017 (0.272)	−0.070 (0.315)	−0.272 ** (0.134)	−0.317 (0.289)	−0.048 (0.038)

Notes: The figures in parentheses are the standard errors. The estimates of the fixed regional and sector effects are not reported.

*** Denotes significance at the 1% level.

** Denotes significance at the 5% level.

The coefficient associated with the India export destination market is positively signed and statistically significant in the wage rate, labour productivity, and TFP specifications. This outcome suggests that an increase in the share of output exported to India is associated with a higher wage rate, labour productivity and TFP in SSA enterprises. Quantitatively, the estimated coefficients imply that a 1% increase in export intensity to the Indian market is associated with a larger wage rate, labour productivity and TFP in SSA manufacturing firms by 0.28%, 1.03% and 0.11%, respectively. The labor productivity effect is particularly large. The result suggests that SSA firms that explicitly target India export-market destination make certain decisions regarding investment, training, technology, and the selection of their inputs, resulting in particularly higher labour productivity.

Regarding the control variables, the results reported in Appendix Table A1 reveal that the size of enterprise and foreign ownership have positive and significant effects on the output, wage rate and TFP of SSA enterprises. In the wage rate and TFP equations, the estimate of the R&D intensity bears a negative sign and is statistically significant, indicating surprisingly that the wage rate and TFP in SSA firms decrease with improvements in R&D intensity. As indicated above, however, the R&D results are unreliable.

4.4.3. Other Asia destination

In 2009, 4.9% of SSA manufacturing firms shipped 0.96% of manufactured products to other Asian markets (see Table 1). The regression results on the influence of ‘Other Asia’ markets destinations on the performance characteristics of enterprises are presented in Panel (iii) Table 5. They indicate that ‘Other Asia’ export market destination does not have any statistically significant effect on the performance of SSA manufacturing firms. The same goes for the export intensity variable. For the control variables (see Appendix Table A1), an increase in the age of enterprises is found to increase the capital intensity and wage rate but to reduce the TFP. Also, capital intensity, labour productivity and TFP rise significantly with the increase in the foreign ownership of enterprises. Again, and surprisingly, an increase in the R&D intensity is associated with a significantly lower TFP level of enterprises. As indicated above, however, the R&D results are unreliable.

4.4.4. EU destination

As the figures in Table 1 show, in 2009 the proportion of SSA manufacturing firms exporting to EU was 16.9% and their corresponding share of foreign sales in total output (export intensity) was 40.8%. In searching for links between EU export-market destination and firm performance characteristics, Panel (iv) Table 5 presents the regression results. There is no clear relationship between the EU destination and the five attributes of enterprise performance. The same is true for the export intensity. With regard to the control variables (see Appendix Table A1), there is evidence that foreign ownership is associated with rising capital intensity, output and labour productivity, while a greater R&D intensity is associated with lower output, labour productivity and TFP. Again, as indicated above, however, the R&D results are unreliable. The results also indicate that the age variable is positively and significantly associated with capital intensity, output, the wage rate and labour productivity.

4.4.5. US destination

As the figures in Table 1 show, in 2009 the proportion of SSA manufacturers exporting to US was 11.2%, and their corresponding share of exports to total output was 10.7%. Panel (v) Table 5 shows the results of the influence of US export destination market on firm performance. As in the case of EU destination, no clear relationship could be established between the US destination and the different indicators of performance. Hence, despite significant tariff preferences into US markets, such as the

AGOA, SSA's manufactured exports to US do not appear to enhance firm-level performance indicators.¹² In all cases, however, an increase in the export intensity is associated with a higher performance: capital intensity, output, and labour productivity. This outcome suggests that enterprises that export more intensively to the USA are more capital intensive and more productive as measured by output and value added per worker.

Concerning the control variables, the results in Appendix Table A1 reveal that firm size and foreign ownership are positively and significantly linked to the output and wage rate of the SSA enterprises that export, respectively. In contrast, an improvement in the R&D intensity tends to reduce the exporting firm-level output, labour productivity and TFP. One again, as indicated above, however, the R&D results are unreliable.

4.4.6. MENA destination

As regards MENA export-market destination, in 2009 5.1% of SSA's manufacturers shipped 9.5% of their output to MENA countries (see Table 1). The evidence on the impact of MENA export market destination on SSA firms' performance is reported in Panel (vi) Table 5. For SSA firms, the effect on performance of exporting to MENA countries is negligible. In the capital intensity and wage rate equations, however, the coefficient of the export intensity variable is significantly positive, implying that SSA firms exporting more intensively are more capital intensive and pay higher wages relative to firms exporting less intensively. Coming to the control variables (see Appendix Table A1), the coefficient of the R&D intensity in columns (2), (3) and (4) is significantly negative. This implies that, for SSA exporting firms, increases in the R&D intensity are associated with significant losses in output, labour productivity and TFP. As indicated above, however, the R&D results are unreliable.

4.4.7. Other destinations

In Table 1, we found that in 2009 the proportion of SSA exporting enterprises to other destinations was 8.1%, and the export intensity to other destinations was nearly 1.8%. The findings on the relationship between exporting and export intensity to 'other destinations' and enterprises performance are presented in Panel (vii) Table 5. The results indicate that the coefficients of the 'other destinations' variable are largely insignificant, suggesting that exporting to 'other destinations' has no effect on the performance characteristics of SSA enterprises. The export intensity variable is positively signed in all cases but is statistically significant only in the capital/labour ratio equation. This outcome implies that SSA firms exporting more intensively have a higher level of capital intensity.

As far as the control variables are concerned, the results in Appendix Table A1 indicate that the coefficient of the size variable in the output equation and the coefficients of foreign ownership in the wage rate and labour productivity equations are positive and statistically significant. This indicates that, for SSA exporting firms, size and foreign ownership are associated with higher output, wage rate and labour productivity, respectively. In the output, labour productivity and TFP equations, the coefficient associated with the R&D intensity variable is negative and statistically significant. Hence, exporting SSA enterprises with increased R&D intensity would be associated with a lower levels of output, labour productivity and TFP. Once again, as indicated above, however, the R&D results are unreliable.

¹² For example, the AGOA provides about 6500 SSA products with preferential quota and duty-free access to the US market. However, to qualify for AGOA benefits, eligible countries must comply with certain stringent standards e.g. working to improve the rule of law, human rights and setting labour standards.

4.4.8. SSA (excluding South Africa) destination

We have found in [Table 1](#) that in 2009 a remarkably high proportion of African manufacturing producers (36.6%) exported within the SSA region. Their corresponding export intensity was 31.3%. The regression results on the link between the SSA export destination and the performance characteristics of enterprises are presented in Panel (viii) [Table 5](#), and they provide some interesting insights.

Across the different specifications, the SSA (excluding South Africa) destination effect is insignificant. The export intensity estimate, however, is negatively signed in all cases but is significantly different from zero in four out of five cases. Therefore, SSA enterprises that export more intensively are relatively young, and less productive as measured by output, value added per worker and TFP. For the control variables reported in Appendix [Table A1](#), the foreign ownership variable positively and significantly affects capital intensity, output, wage rate, and labour productivity at conventional levels of significance. There is evidence that firm size is associated with rising output in a statistically significant way in column (2). In contrast, greater R&D intensity is associated with lower output, wage rate, labour productivity and TFP. As indicated above, however, the R&D results are unreliable.

4.4.9. South Africa destination

Finally, in 2009 the proportion of SSA producers exporting to South Africa was 8.7% with a corresponding share of exports in total output of 2.8% (see [Table 1](#)). Panel (ix) [Table 5](#) presents the regression results on the relationship between the South Africa export destination and intensity versus the performance characteristics of enterprises. Regarding the role of export destination, the results show that an improvement in the export intensity is negatively associated with lower capital intensity. The results for the export intensity indicate that enterprises that export more intensively tend to pay lower wages.

The results associated with the control variables in Appendix [Table A1](#) indicate that older firms tend to be capital intensive, to pay higher wages, and to be more productive as proxied by output, labour productivity and TFP. Consistent with findings for the other destinations, an increase in the R&D intensity is surprisingly associated with a significant lower output, labour productivity and TFP. As indicated above, however, the R&D results are unreliable.

To summarize, three destinations of SSA manufacturing exports are significantly correlated with the performance characteristics of enterprises and their propensity to export. First, China is an excellent destination in terms of improvements in TFP. Second, exporting to India enhances the wage rate, labour productivity and TFP. Third, the South Africa destination depresses capital intensity. Finally, the scale of exporting influences the performance of exporters, particularly with exports to the USA (positively) and to other SSA countries (negatively).

5. Conclusion

The objective of this paper, which uses a novel manufacturing firm-level dataset of 2009 in 19 sub-Saharan Africa (SSA) countries, was three-fold. The first was to determine the export premia and the impact of export behaviour on different performance measures, e.g., capital intensity, output, wage rate, labour productivity, and total factor productivity (TFP). The second was to assess the determinants of exporting. Finally, the study examined whether export-market destination mattered.

We find that SSA manufacturing firms that export differ from those that do not along a variety of dimensions: they are larger as measured by employment and output, more productive, more capital intensive, and pay higher wages. Moreover, foreign ownership and past export experience enhance the propensity to export, while continuing exporters outperform switching exporters. Regarding the role of export destination in the relationship between enterprise performance and exporting, three basic results emerge. Firstly, in terms of TFP, China appears to be the best destination. Secondly, exporting to India

enhances the wage rate, labour productivity and TFP, with the labour productivity impact by far the largest among all the destinations. Thirdly, the South Africa destination impedes capital intensity. Finally, the scale of exporting matters for the performance of exporters. In particular, higher export intensity to the USA tends to be associated with improved performance, while the reverse appears to be the case with exports to other SSA countries.

From an industry policy standpoint, for a continent that is currently juggling multiple trade partners without a coherent and coordinated strategy, China and India export-market destinations could bolster the industrialization prospects of SSA countries. Meanwhile, the finding that export intensity is associated with particularly exports to the USA suggests that increasing volumes of exports to that country should be encouraged. Unfortunately, however, the reverse appears to be the case with exports to other SSA countries. The latter finding does not augur well for increased intra-Africa trade. Hence, SSA policymakers should recognise this opportunity and position themselves accordingly.

Appendix A

Variable	ln(capital intensity) (1)	ln(output) (2)	ln(wage rate) (3)	ln(labour productivity) (4)	ln(TFP) (5)
<i>(i) China destination</i>					
ln(China destination intensity)	−0.173 (0.583)	−0.020 (0.495)	−0.349 (0.698)	0.971 (0.653)	0.205 ** (0.099)
ln(export intensity)	−0.925 (0.989)	−0.643 (0.840)	−1.181 (1.183)	−0.508 (1.106)	0.038 (0.167)
Size	0.412 (1.300)	2.998 *** (1.104)	−0.781 (1.555)	2.532 ** (1.454)	0.582 *** (0.220)
ln(age)	0.830 *** (0.341)	0.633 *** (0.290)	0.370 (0.408)	0.288 (0.382)	−0.024 (0.058)
Foreign ownership	4.053 *** (1.170)	2.678 *** (0.994)	1.383 (1.400)	3.338 *** (1.308)	0.365 ** (0.198)
ln(R&D) intensity	0.238 (0.173)	−0.040 (0.147)	0.021 (0.208)	−0.376 ** (0.194)	−0.131 *** (0.029)
# observations	860	860	806	749	765
R-squared	0.645	0.594	0.148	0.527	0.701
<i>(ii) India destination</i>					
ln(India destination intensity)	0.234 (0.620)	0.203 (0.393)	0.283 ** (0.128)	1.031 *** (0.316)	0.111 *** (0.043)
ln(export intensity)	0.680 (0.679)	0.612 (0.430)	−0.010 (0.140)	−0.292 (0.346)	−0.143 *** (0.047)
Size	−1.366 (1.181)	1.925 *** (0.749)	0.028 (0.243)	−0.179 (0.602)	0.210 *** (0.082)
ln(age)	−0.591 (0.725)	−0.540 (0.459)	0.125 (0.149)	−0.398 (0.369)	−0.020 (0.050)
Foreign ownership	0.783 (1.066)	0.062 (0.676)	1.059 *** (0.220)	0.430 (0.544)	0.150 ** (0.074)
ln(R&D) intensity	0.224 (0.272)	−0.036 (0.172)	−0.103 ** (0.056)	−0.123 (0.139)	−0.095 *** (0.019)
# observations	860	860	806	749	765
R-squared	0.276	0.447	0.738	0.551	0.784
<i>(iii) Other Asia destination</i>					
ln(other Asia destination intensity)	−0.379 (0.432)	0.030 (0.588)	−0.563 (0.383)	−0.144 (0.484)	−0.028 (0.058)
ln(export intensity)	−0.313 (0.654)	−0.140 (0.890)	−0.369 (0.579)	−0.877 (0.732)	0.080 (0.087)
Size	−0.874 (1.308)	1.507 (1.782)	−1.839 (1.159)	1.158 (1.466)	0.435 *** (0.175)
ln(age)	0.881 *** (0.367)	0.682 (0.500)	1.004 *** (0.325)	−0.074 (0.411)	−0.190 *** (0.049)
Foreign ownership	1.784 ** (0.993)	0.379 (1.353)	−0.056 (0.880)	2.668 *** (1.113)	0.486 *** (0.133)

Table A1 (continued)

Variable	ln(capital intensity) (1)	ln(output) (2)	ln(wage rate) (3)	ln(labour productivity) (4)	ln(TFP) (5)
ln(R&D) intensity	0.181 (0.174)	−0.113 (0.237)	0.148 (0.154)	−0.421 ** (0.195)	−0.121 *** (0.023)
# observations	860	860	806	749	765
R-squared	0.555	0.178	0.588	0.373	0.781
<i>(iv) EU destination</i>					
ln(EU destination intensity)	−0.123 (0.156)	−0.213 (0.163)	0.014 (0.090)	−0.215 (0.151)	−0.019 (0.029)
ln(export intensity)	0.160 (0.191)	−0.095 (0.200)	0.119 (0.111)	−0.020 (0.185)	−0.045 (0.035)
Size	−0.749 (0.543)	1.462 *** (0.549)	−0.364 (0.303)	−0.585 (0.508)	−0.040 (0.097)
ln(age)	0.806 *** (0.255)	0.755 *** (0.268)	0.391 *** (0.148)	0.529 ** (0.248)	0.0001 (0.047)
Foreign ownership	0.952 ** (0.491)	0.824* (0.515)	0.430 (0.285)	0.973 ** (0.477)	0.102 (0.091)
ln(R&D) intensity	−0.106 (0.098)	−0.423 *** (0.103)	0.021 (0.057)	−0.444 *** (0.095)	−0.091 *** (0.018)
# observations	862	862	808	750	766
R-squared	0.241	0.519	0.175	0.397	0.348
<i>(v) US destination</i>					
ln(US destination intensity)	−0.253 (0.265)	−0.231 (0.267)	0.019 (0.142)	−0.079 (0.260)	−0.083 (0.055)
ln(export intensity)	0.741 ** (0.433)	0.956 ** (0.437)	0.127 (0.231)	0.840 ** (0.426)	0.045 (0.090)
Size	−0.405 (0.753)	2.936 *** (0.760)	−0.354 (0.402)	−0.503 (0.740)	0.065 (0.156)
ln(age)	0.479 (0.342)	0.179 (0.345)	0.362 ** (0.183)	0.203 (0.336)	−0.102 (0.071)
Foreign ownership	0.964 (0.838)	0.707 (0.846)	0.972 ** (0.447)	0.618 (0.823)	0.034 (0.173)
ln(R&D) intensity	−0.087 (0.126)	−0.242 ** (0.127)	−0.022 (0.067)	−0.291 *** (0.124)	−0.070 *** (0.026)
# observations	860	860	808	749	765
R-squared	0.321	0.630	0.331	0.367	0.231
<i>(vi) MENA destination</i>					
ln(MENA destination intensity)	0.021 (0.270)	0.069 (0.290)	−0.082 (0.090)	0.023 (0.183)	−0.018 (0.041)
ln(export intensity)	0.478 ** (0.279)	0.072 (0.301)	0.432 *** (0.094)	0.188 (0.189)	0.039 (0.042)
Size	−1.478 ** (0.830)	1.732 ** (0.894)	−0.423 (0.278)	−0.387 (0.563)	0.028 (0.126)
ln(age)	0.566 (0.527)	0.076 (0.567)	0.194 (0.176)	−0.010 (0.356)	0.030 (0.080)
Foreign ownership	1.267 ** (0.648)	0.531 (0.698)	0.784 *** (0.217)	1.241 *** (0.439)	0.121 (0.099)
ln(R&D) intensity	0.0003 (0.130)	−0.410 *** (0.140)	0.001 (0.043)	−0.345 *** (0.088)	−0.095 *** (0.020)
# observations	861	861	807	750	766
R-squared	0.374	0.411	0.700	0.568	0.555
<i>(vii) Other destinations</i>					
ln(other destinations intensity)	−0.225 (0.308)	−0.032 (0.266)	−0.267 (0.185)	−0.093 (0.205)	0.011 (0.038)
ln(export intensity)	0.555 ** (0.314)	0.284 (0.271)	0.279 (0.188)	0.289 (0.209)	0.022 (0.038)
Size	0.253 (0.732)	2.739 *** (0.632)	−0.450 (0.439)	−0.077 (0.487)	−0.095 (0.089)
ln(age)	0.420 (0.537)	0.445 (0.464)	0.276 (0.322)	0.507 (0.357)	0.048 (0.066)
Foreign ownership	0.675 (0.634)	0.226 (0.548)	1.422 *** (0.380)	0.737 ** (0.422)	0.098 (0.077)
ln(R&D) intensity	−0.068 (0.140)	−0.424 *** (0.121)	−0.013 (0.084)	−0.359 *** (0.093)	−0.058 *** (0.017)

(continued on next page)

Table A1 (continued)

Variable	ln(capital intensity) (1)	ln(output) (2)	ln(wage rate) (3)	ln(labour productivity) (4)	ln(TFP) (5)
# observations	862	862	808	751	766
R-squared	0.279	0.665	0.484	0.531	0.374
<i>(viii) SSA (excluding South Africa) destination</i>					
ln(SSA destination intensity)	0.086 (0.191)	0.160 (0.182)	0.079 (0.163)	0.071 (0.163)	−0.008 (0.032)
ln(export intensity)	−0.062 (0.121)	−0.217 ** (0.116)	−0.363 *** (0.104)	−0.363 *** (0.104)	−0.065 *** (0.020)
Size	0.382 (0.343)	2.099 *** (0.327)	0.183 (0.294)	0.183 (0.294)	−0.028 (0.057)
ln(age)	0.194 (0.172)	0.445 *** (0.164)	0.257 ** (0.147)	0.257 ** (0.147)	0.016 (0.028)
Foreign ownership	0.498 ** (0.249)	0.411 ** (0.238)	0.480 ** (0.213)	0.480 ** (0.213)	0.063 (0.041)
ln(R&D) intensity	0.002 (0.057)	−0.205 *** (0.054)	−0.274 *** (0.048)	−0.274 *** (0.048)	−0.053 *** (0.009)
# observations	863	864	810	753	769
R-squared	0.060	0.432	0.118	0.306	0.257
<i>(ix) South Africa destination</i>					
ln(South Africa destination intensity)	−0.595 *** (0.258)	0.011 (0.299)	−0.112 (0.127)	−0.043 (0.275)	0.057 (0.036)
ln(export intensity)	0.017 (0.272)	−0.070 (0.315)	−0.272 ** (0.134)	−0.317 (0.289)	−0.048 (0.038)
Size	−0.624 (0.694)	2.253 *** (0.804)	−0.328 (0.342)	−0.606 (0.740)	−0.163 * (0.098)
ln(age)	1.099 *** (0.441)	1.387 *** (0.510)	0.353 * (0.217)	1.403 *** (0.469)	0.177 *** (0.062)
Foreign ownership	0.659 (0.610)	0.696 (0.707)	0.276 (0.301)	1.090 * (0.650)	0.166 ** (0.086)
ln(R&D) intensity	−0.143 (0.142)	−0.270 * (0.164)	−0.075 (0.070)	−0.388 *** (0.151)	−0.048 *** (0.020)
# observations	860	860	806	749	765
R-squared	0.480	0.587	0.282	0.478	0.490

Notes: The figures in parentheses are the standard errors. The estimates of the fixed regional and sector effects are not reported.

*** Denotes significance at the 1% level.

** Denotes significance at the 5% level.

* Denotes significance at the 10% level.

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