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Importing, Exporting and Performance in sub-Saharan African Manufacturing Firms

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Importing, Exporting and Performance in sub-Saharan African Manufacturing Firms[♦]

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Abstract

This paper examines productivity differences between internationally trading and non-trading firms using data on a sample of firms from 19 sub-Saharan African countries. The paper provides the first evidence of whether exporters, importers and two-way traders perform better than non-traders, and whether there are differences in performance between different types of trading firms in sub-Saharan Africa. Our results indicate that exporters, importers and two-way traders perform better than non-exporters, non-importers and non two-way traders. We further find that two-way traders perform better than importers only or exporters only, results largely consistent with recent results for other countries and regions. Considering information on export starters, continuers and exiters we also present some evidence suggesting that there is no significant difference in performance between export continuers and starters.

Keywords: Firm-level Performance, Importers, Exporters

JEL Codes: D24, F10, M20, L10

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1. Introduction

Since the seminal study of Bernard and Jensen (1995) there has been a large volume of research considering the relationship between exporting and firm-level performance. These papers consider data on a large number of developed, developing and transition economies. Despite differences in methodology and country samples the results tend to be fairly consistent, and point to the conclusion that productivity is higher for exporters (see Wagner (2007) and (2012) for recent surveys and Martins and Yang (2009) for a meta-analysis of existing studies).[1] There are two alternative – though not necessarily mutually exclusive – explanations as to why exporters may be more productive than non-exporters. Self-selection of more productive firms into export markets may occur because there are additional costs associated with selling goods abroad that may include transport, distribution and marketing costs, the cost of personnel with skills to manage foreign networks, or production costs from modifying domestic products for foreign consumption (Fryges and Wagner, 2008). Exporting may also be a source of learning however, resulting in an improvement in post-entry performance. Exporting can be an important channel of information flows with overseas buyers sharing knowledge of the latest design specifications and production techniques that might otherwise be unavailable, as well as providing a competitive environment, in which efficiency advantages can be obtained. The majority of existing studies conclude in favour of self-selection and against the learning-by-exporting hypothesis, with only a few studies reaching the opposite conclusion (for example Kraay, 2002; Bigsten et al, 2004; Aw et al, 2000). In general, evidence in favour of learning effects tend to be stronger in developing countries, which has been attributed to the fact that emerging and developing economies exporters often trade with relatively skilled and advanced countries where they can benefit from customer's technical assistance, new managerial practices, market information, information systems and supply chain networks for example.

[1] In response to such empirical studies theoretical models such as that of Melitz (2003) were developed that provided a rationale for the observed positive relationship between export status and firm productivity, with firms in these models self-selecting into export markets due to sunk costs of exporting.

While the focus of the empirical firm-level literature has been on the relationship between exports and productivity there are good reasons to believe that imports could also be a significant source of productivity benefits. Krugman (1993) for example states that "What a country really gains from trade is the ability to import things it wants. Exports are not an objective in and of themselves; the need to export is a burden that a country must bear because its import suppliers are crass enough to demand payment." Capital and intermediate goods imports for example that embody new technologies would be expected to bring in new knowledge that may ultimately enhance a country's – or firm's – productivity. Imported intermediates may also affect productivity through the use of imported inputs that are of a better quality than domestic counterparts, and through complementarity, whereby combining different intermediates creates gains that are more than the sum of their parts, which could be due to imperfect substitution across goods as in love-of-variety models as well as learning spillovers between foreign and domestic goods.[2] Cheaper imports may allow firms to produce existing goods using the same inputs as before, but at a lower cost. They could also open up new ways of producing existing goods, and even allow entirely new goods to be made.

In response to these arguments and the increasing availability of firm-level data with information on importing a small empirical literature has considered the relationship between importing and firm-level performance.[3] Empirical studies of importing and performance now exist for a number of developed countries (Belgium, Denmark, France, Germany, Ireland, Italy, Portugal,

[2] Indeed, a large empirical literature at the country and industry level has examined the importance of knowledge spillovers through imports and found them to be economically significant both between developed countries, and also from developed to developing countries (for seminal studies see Coe and Helpman (1995) and Coe et al (1997)).
[3] Much of this recent literature on importing and performance has concentrated on the firm-level effects of offshoring. In addition to allowing firms to acquire inputs at lower costs and to acquire inputs embodying a higher level of technology, offshoring of production gives firms the opportunity to allocate their resources to the activities where they are most productive, helping to increase specialisation and benefit from economies of scale. Despite such benefits there are also likely to be costs to the firm from offshoring. Such costs may include those related to differences in language, management culture and legal systems, as well as the search costs involved in finding partners in distant and foreign markets.

Spain, Sweden, the UK and the USA). There remain relatively few studies of the importer-productivity relationship for transition and developing countries however (see Table 2 of Wagner, 2012). The results of studies of the importer premium tend to indicate that importers perform better than non-importers. A number of such studies combine the impact of importing and exporting by allowing the impact of international trade to differ depending upon whether the firms are exporters only, importers only or two way traders (see for example Muuls and Pisu, 2009; Andersson et al, 2008; Castellani et al, 2010; Vogel and Wagner, 2010). The results from such studies indicate that the impact of trade on performance tends to be stronger for two way traders followed by importers and exporters, with all groups performing better than firms not engaged in international trade.

When considering the relationship between firm-level performance and importing the issue of self-selection versus learning again arises. We would expect there to be fixed costs associated with importing which would support the view that firms self-select into importing[4], with high-productivity firms offshoring their production and low-productivity firms limiting themselves to domestic sourcing.[5] Andersson et al (2008) argue however that there are strong arguments in favour of a causal impact of importing on productivity. In particular, by importing a firm can exploit global specialization and use inputs from the technology frontier. Importing intermediates also allows firms to specialize on activities where it has particular strengths. Castellani et al (2010) argue that importers may improve productivity by using higher quality foreign inputs or by extracting technology embodied in imported intermediates and capital goods. A small number of studies test for self-selection versus learning by importing effects (for

[4] Such costs may include search costs as firms seek potential foreign suppliers, as well as costs related to the inspection of goods, negotiation and contract formulation, as well as to acquisition and customs procedures.
[5] See Antras and Helpman (2004) who develop a model similar to Melitz (2003) in which it is assumed that there are fixed costs to importing, and which results in the self-selection of firms into importing.

example Vogel and Wagner, 2010), with the results tending to support the self-selection hypothesis.

In this paper we employ a variety of parametric and non-parametric tests to consider differences in firm-level performance between firms engaged in international trade and those that are domestically oriented for a large sample of manufacturing firms in 19 sub-Saharan African (SSA) countries.[6] The paper makes a number of contributions to the literature on international trade and performance at the firm-level. Firstly, the paper introduces a new and current firm-level database that covers 19 SSA firms (see UNIDO, 2012).[7] Secondly, the dataset covers a larger number of SSA countries and a larger number of SSA firms than any other database we are aware of. To date there has been relatively little empirical work using firm-level data on African firms and these tend to be concentrated in a small number of countries. Examples include Mengistae and Pattillo (2004) for Ethiopia, Ghana and Kenya; Van Biesebroeck (2005) for Burundi, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Tanzania, Zambia, Zimbabwe; Bigsten et al (2004) for Cameroon, Ghana, Kenya and Zimbabwe; and Bigsten and Gebreeyesus (2009) for Ethiopia. Interestingly, while all of these studies find that exporters perform better than non-exporters (often across a number of performance measures) they all also present at least some evidence consistent with the learning-by-exporting hypothesis. Thirdly, the paper presents the first evidence on the importer premium for SSA firms that we are aware of, with the paper considering differences in performance between exporters, importers, two-way traders and domestically oriented firms. Our results indicate that exporters, importers and two-way traders perform better than non-exporters, non-importers and non two-way traders. We further find

[6] Recently – as data have become available – studies have begun to consider the trade-productivity relationship for services firms also (see Wagner, (2012, Table 3) for a review of these studies and Foster-McGregor et al (2012a) for evidence in SSA).

[7] This dataset has been used elsewhere to consider different aspects of the relationship between firm performance and the way that a firm serves a foreign market. Foster et al (2012b) for example use this dataset to examine whether SSA firms that serve foreign markets through FDI perform better than those serving foreign markets through exporting. Results are found to differ between manufacturing and services firms.

that two-way traders perform better than importers only and exporters only. We further present evidence indicating that there is no significant difference in performance between export starters and export continuers.

The remainder of the paper is set out as follows. Section 2 discusses the methodology used in our analysis. Section 3 discusses the data used in the analysis along with some initial descriptive statistics. Section 4 describes the results and Section 5 summarises and concludes.

2. Methodology

In order to test for differences in performance between trading and non-trading firms and between different kinds of trading firms we employ a number of statistical methods. We begin by reporting results from a simple comparison of means test. Such a test concentrates on only one moment of the distribution however, the mean. As such, we also make use of the concept of first order stochastic dominance, which allows one to both compare and rank the entire distributions of – in our case – firm performance. In particular, we follow the approaches of Deglado et al (2002) and Girma et al (2004) and make use of the non-parametric one- and two-sided Kolmogorov-Smirnov (KS tests), which is described below.

Let F and G be two cumulative distribution functions, for example, the productivity of exporters and non-exporters. Then first order stochastic dominance of F relative to G means that $F(z) - G(z)$ must be less or equal to zero for all values of z, with strict inequality for some z. This can be tested using the one-sided and two-sided Kolmogorov-Smirnov (KS) test. The two-sided KS statistic tests the hypothesis that both distributions are identical, and the null and alternative hypotheses can be expressed as:

$$H_0: F(z) - G(z) = 0 \qquad \forall\, z \in \Re$$
$$H_1: F(z) - G(z) \neq 0 \quad \text{for some } z \in \Re$$

While the one-sided test can be formulated as:

$$H_0: F(z) - G(z) \leq 0 \qquad \forall\, z \in \Re$$
$$H_1: F(z) - G(z) > 0 \quad \text{for some } z \in \Re$$

In order to conclude that F stochastically dominates G requires that one can reject the null hypothesis for the two-sided test, but not for the one-sided test. In our analysis below we report results from the one-sided test for both the hypothesis that F dominates G and that G dominates F.

The KS test statistic for the two- and one-sided tests are:

$$KS_2 = \sqrt{\frac{n.m}{N}} \max_{1 \leq i \leq N} \{F_n(z_i) - G_m(z_i)\}$$

$$KS_1 = \sqrt{\frac{n.m}{N}} \max_{1 \leq i \leq N} |F_n(z_i) - G_m(z_i)|$$

respectively, where n and m are the sample sizes from the empirical distributions of F and G respectively, and $N = n + m$.

We further report results from regression analysis, which enables us to estimate the so-called productivity premium for different types of trading firms. The productivity premium is defined as the difference in labour productivity between internationally trading firms and firms that do not trade internationally after controlling for other relevant characteristics of firms. Additional characteristics included in our regression model are a measure of firm size (the log value of employment) and its squared term, the (logged) capital-labour ratio and a measure of human capital. We further include a variable capturing the firm's age and its ownership status, that is,

whether it is domestically- or foreign-owned.[8] In addition to these variables we further account for country- and sector-differences through the inclusion of country and sector dummies separately or sector-country dummies. The basic estimating equation therefore is of the following form:

$$\ln Y_{ijk} = \beta_1 \ln EMP_{ijk} + \beta_2 \left(\ln EMP_{ijk}\right)^2 + \beta_3 AGE_{ijk} + \beta_4 K/L_{ijk} + \beta_5 HK_{ijk} + \beta_6 FOR_{ijk} + \beta_7 EXP_{ijk} + \beta_8 IMP_{ijk} + \beta_9 TWOWAY_{ijk} + \theta_i + \varphi_j + \varepsilon_{ijk} \quad (1)$$

where Y is our measure of firm performance (i.e. output per worker) in firm k in country i and sector j, EMP is the (logged) number of employees, AGE is firm age in years, K/L is the (logged) capital-labour ratio, HK is a measure of human capital[9], FOR is a dummy taking the value one if the firm is foreign-owned, EXP, IMP and $TWOWAY$ are dummies for exporters, importers, and two-way traders respectively, and θ_i and φ_j are country- and sector-specific effects respectively. In various specifications these latter effects are replaced by sector-country fixed effects, τ_{ij}.

The above regression equation is estimated using standard OLS techniques along with the standard within regression when including sector-country fixed effects. Such models seek to estimate the productivity premia at the conditional mean of the productivity distribution. There are reasons to believe however that the impact of trading is likely to differ across firms. In particular, the recent theoretical literature on trade and productivity (e.g. Melitz, 2003) suggests that firm heterogeneity is to be expected. To account for this possibility therefore we also estimate the above regression model using quantile regression (QR) methods, which estimate the

[8] A separate literature exists suggesting that foreign-owned firms perform better than domestically-owned ones (see for example Harris, 2002; Harris and Robinson, 2003; Yasar and Morrison-Paul, 2007). Following existing studies we define a firm as foreign owned if more than 10% of the equity of the firm is owned by non-residents.
[9] Defined as the ratio of technical, administrative and sales workers in total employment.

parameters of the model at different points on the (conditional) productivity distribution.[10] The method thus allows one to estimate different parameters on the trade dummies for under-achievers (i.e. those at the lower end of the conditional productivity distribution) and over-achievers (i.e. those at the upper end). In addition to allowing for non-linearities in the relationship between a firm's trading status and its performance, QR has a number of other advantages over OLS. A further benefit relates to the fact that median regression methods can be more efficient than mean regression estimators in the presence of heteroscedasticity. QR is also robust with regard to outlying observations in the dependent variable. The QR objective function is a weighted sum of absolute deviations, which gives a robust measure of location, so that the estimated coefficient vector is not sensitive to outlier observations on the dependent variable. Finally, when the error term is non-normal, QR estimators may be more efficient than least squares estimators.

One problem with the use of QR arises when including a large number of fixed effects, such as in the case where we include sector-dummy fixed effects. In particular, the inclusion of a large number of fixed effects leads to an incidental parameters problem; with a large number of cross-sectional units (i.e. sector-country fixed effects) and a small number of observations for each cross-sectional unit the estimates of the fixed effects are likely to be poor. The poor quality of the estimates of the country fixed effects causes the estimates of the main parameters of interest to be badly behaved. Koenker (2004) discusses approaches to deal with such problems, including a class of penalised QR estimators, while Powell (2010) develops an unconditional QR estimator that allows for the inclusion of fixed effects. Both of these approaches are computationally intensive however. Recently, Canay (2011) has introduced an alternative method of estimating QR models with fixed effects that is easy to implement using standard software. The method is

[10] For an introduction to quantile regression models see Buchinsky (1998) and Koenker and Hallock (2001).

based upon the assumption that the fixed-effects in the model act like pure location shift effects, meaning that the fixed effects are constant across quantiles. Given this assumption, Canay proposes the following two-step estimator for a standard panel with N cross-section units and T time periods:

(i) Estimate the standard fixed effects regression at the conditional mean and using the estimated parameters from this model construct estimates for the individual fixed effects as $\hat{\alpha}_i = \frac{\sum_{t=1}^{T}(Y_{it} - X_{it}'\hat{\beta}_\mu)}{T}$, where $\hat{\alpha}_i$ are the estimated fixed effects, Y_{it} is the dependent variable, X_{it} are the explanatory variables, and $\hat{\beta}_\mu$ are the estimated parameters from the conditional mean regression.

(ii) Define $\hat{Y}_{it} \equiv Y_{it} - \hat{\alpha}_i$ and estimate the QR model using this newly defined variable as the dependent variable.

Canay (2011) also proposes a bootstrap procedure for estimating the variance-covariance matrix for this estimator. The bootstrap method is implemented by drawing with replacement a sample of size NT and computing the two-step estimator as described above. Repeating this a total of B times the estimated bootstrapped variance-covariance matrix at quantile τ is constructed as:

$$\frac{1}{B}\sum_{j=1}^{B}\left(\hat{\beta}_j^*(\tau) - \bar{\beta}^*(\tau)\right)\left(\hat{\beta}_j^*(\tau) - \bar{\beta}^*(\tau)\right)'$$

where $\hat{\beta}_j^*(\tau)$ are the estimated parameters from the jth bootstrap and the τth quantile, and $\bar{\beta}^*(\tau) = \frac{1}{B}\sum_{j=1}^{B}\hat{\beta}_j^*(\tau)$.

We adapt this approach to our dataset, which has no time dimension but does have a country, sector and firm dimensions. In our analysis we account for sector-country fixed effects and so

follow step 1 above to construct estimates for sector-country fixed effects and then use these to define the transformed dependent variable for use in step 2.

In addition to QR, we further report results from an alternative robust regression method. The reason for this is that QR protects only against vertical outliers, i.e. observations that are outlying in the y-dimension but not in the space of explanatory variables. QR doesn't protect against bad leverage points, which are observations that are both outlying for the error term and the space of explanatory variables (Verardi and Croux, 2009). To overcome this limitation, a number of alternative robust regression methods have been developed, such as the M-estimator of Huber (1964), the class of S-estimators of Rousseeuw and Yohai (1987) and the MM-estimators of Yohai (1987). In a panel context, Bramatia and Croux (2007) have proposed two robust estimators, namely the Within Groups Generalized M-estimator and the Within Groups MS-estimator. These both involve centring the data in a manner similar to that used in the standard within-groups estimator, but centring by removing the median rather than the mean. Once centred a robust estimator is applied to deal with outlying observations. In this paper we follow a similar approach suggested by Verardi and Wagner (2012) which proceeds in three steps. The first step is to centre the variables, which in our case implies removing the country-industry specific median from each of our variables. In the second step we regress the centred dependent variable on the centred explanatory variables using the robust S-estimator. Using the residuals from this regression and the estimated standard error of the residuals, we then identify outlying observations by flagging those firms that have robust standardised residuals that are larger than 2. Finally, we run a standard fixed-effects regression model awarding a weight of zero to the outliers.

3. Data

The data are drawn from the most recent UNIDO African Investor Survey (AIS) which was conducted over the period 2010-2011 and which surveys over 6,000 agricultural, industrial and services firms in 19 SSA countries (see UNIDO, 2012).[11] In order to ensure that the interviewed firms accurately represent the countries' economies, the samples were drawn from sampling frames which contained all available information about business activities in the survey countries. Furthermore, the sample was drawn by stratifying the sampling frames along the dimensions of size (10-49, 50-99 or 100+ employees), ownership (domestic or foreign) and sector (ISIC Rev. 3.1 2-digit level), and selecting companies randomly within each stratum. The data were collected mainly via face-to-face interviews between the respondent and a UNIDO enumerator, along with drop and pick in some occasions. The respondents were usually senior managers of the firm or – in the case of foreign ownership – the local subsidiary. After the interview, the data were checked in the country by supervisors and re-checked at UNIDO headquarters.

The UNIDO dataset is unique in that it covers a relatively large number of African countries and a large number of firms. As far as we aware, the survey is the largest single survey for Africa in terms of both country and firm coverage, with a number of the countries in the UNIDO dataset being surveyed for the first time. In addition, the survey is current with the survey having been conducted in 2010 and 2011. One drawback of the AIS for empirical work is that the data have a firm, industry and country dimension only, with no time dimension available. This is considered a drawback since in much of the recent regression analysis on firm-level performance researchers have attempted to deal with issues of endogeneity and firm-level heterogeneity through the use of firm fixed effects and matching econometrics (see Wagner, 2007 and 2012). The use of panel

[11] The data used in this paper are confidential, but not exclusive. In order to gain access to the data researchers will need to contact UNIDO and sign a confidentiality agreement. Once this agreement has been signed the authors would be happy to share the sample of data used in their analysis. The Stata programs used to estimate all of the results in the paper are also available from the authors on request.

data with time-series variation also allows one to ask whether there are pre-entry differences between export starters and non-exporters to shed light on the issue of whether high performing firms self-select into export markets or whether firms become more productive through exporting. Despite this, the AIS does ask for some information on past performance. In particular, the survey asks for information on output, employment and export status in the previous period. We use this information below to examine differences in productivity performance for export starters, exiters and continuers.

In this paper we use data on the sub-sample of industrial firms (ISIC Rev.3.1 divisions 15 to 37), which ensures that our dataset is consistent with the bulk of existing research. The final usable sample covers a maximum of 2,870 firms in 19 countries. In our analysis we consider all countries together rather than reporting separate results for each country since for a number of countries in our sample there are relatively few firm observations (see Table A1 in the appendix), which would make it difficult to obtain reliable estimates of the productivity differences between internationally trading and domestically-oriented firms. In our initial analysis we consider differences between firms with and without foreign exposure across a number of performance indicators. In particular, we compare firms by; (i) the log of labour productivity (defined as the ratio of output to employment); (ii) the log of Total Factor Productivity (TFP)[12]; (iii) the log of sales[13]; (iv) the log of the capital-labour ratio (K/L); (v) log employment; (vi) the log of average wages; and (vii) the log of the annual average pre-tax profit margin[14]. In the regression analysis that follows later however we follow much of the existing literature and concentrate on a single measure of performance, namely the log of labour productivity. We further define three trade status variables for the following categories: (i) exporters only; (ii) importers only; and (iii) two-

[12] TFP is estimated by assuming a constant capital share of one third. In particular, TFP is defined as: $TFP = VA\ /\ (EMP^{2/3}FA^{1/3})$, where VA is value-added, EMP refers to total employment and FA to total fixed assets.
[13] All monetary values are expressed in US dollars, using the average exchange rate over the previous three years (2009-2011).
[14] Defined as the ratio of net (pre-tax) profit to revenue (multiplied by 100).

way traders (i.e. simultaneous exporters and importers). In the productivity comparison for two-way traders we usually make the comparison between two-way traders and non two-way traders, a group which may include exporters and importers. We do however also report results from a comparison in performance between two-way traders and exporters and importers only in the later analysis.

Before reporting results from the formal statistical tests we initially report a number of descriptive statistics for our sample of firms. Table 1 reports simple frequency data for the full sample, while Table 2 reports summary statistics for our chosen performance measures for all firms, as well as for the different categories of firms (i.e. domestically oriented, exporters, importers, two-way traders). We can see from Table 1 that a much smaller percentage of firms are exporters only (just 8.4%) than importers only (34.3%), with 25.0% of firms simultaneously exporting and importing. Just over a third of firms (35.8%) are classed as being foreign-owned, with 51% and 75% of these firms being exporters and importers respectively – a higher percentage than for the full sample of firms. In the regression analysis below we will take account of the fact that foreign owned firms are more likely to be involved in international trade by including a foreign ownership dummy variable. The frequency table also indicates that only a very small number of firms stopped exporting or began exporting in the year of the survey (0.9% and 4%).

Data reported in Tables A1 and A2 indicate that in our sample exporting (including simultaneous importers and exporters) is relatively common in Kenya, Lesotho and Madagascar, with importing being common in Lesotho, Rwanda and Mozambique. By sector, we find that exporting is a relatively frequent activity in tobacco products; tanning and dressing of leather; and the manufacture of coke, refined petroleum products and nuclear fuel. Importing is also relatively frequent in these industries as well as chemicals; rubber and plastics; electrical

machinery; medical, precision and optical instruments; motor vehicles; and other transport equipment.

Table 1: Frequency Table

Variable	Frequency	Percentage of Total
Total Number of Firms	2,870	100
Exporter only	241	8.40
Importer only	985	34.32
Two-way	718	25.02
Foreign	1,026	35.75
Foreign exporter	523	18.22
Domestic exporter	436	15.19
Foreign importer	768	26.76
Domestic importer	935	32.58
Export exiter	25	0.87
Export starter	115	4.01
Export continuer	785	27.35

Notes: This table reports simple frequency statistics of firms by type. When splitting countries into foreign and domestic exporters and importers no distinction is made between firms that both export and import. This explains why the number of foreign and domestic exporters exceeds the number of exporters only for example.

Table 2 reports the mean values of the performance variables, with the median also reported in brackets. These initial summary statistics hint at there being differences between trading firms and non-trading firms as well as between the different types of trading firms. The table indicates that according to both the mean and median, trading firms perform better than domestically-oriented firms across nearly all performance measures, the exception being the log of the pre-tax profit margin. These differences tend to be economically important. To give some idea of this we can observe that median output per worker is 133% larger for exporters than for domestically-oriented firms, with the differences being 144% and 260% for importers and two-way traders. Results for TFP are somewhat smaller (ranging from 50% to 88%), but are even larger for sales (ranging from 310% to 1388%). The capital-labour ratio is found to be between 92% (exporters) and 154% (two-way traders) higher than domestically-oriented firms, with

employment (75% to 318%) and average wages (106% to 708%) also considerably higher for trading firms. The table also indicates that with the exception of the profit margin the mean and median values of the performance indicators are larger for two-way traders than for either exporters or importers, results similar to those found elsewhere. While these differences tend to be much smaller than those for the comparison with domestically-oriented firms (i.e. usually less than a 50% difference), large differences are found in the case of sales (108% and 263% difference compared to exporters and importers respectively) and for importers only in the case of employment (139%) and wages (204%). Interestingly, the mean and median values of most performance measures (except output per worker and the capital-labour ratio) are higher for exporters than for importers, which is different to that found in many other studies.

Table 2: Summary Statistics

Variable	All firms	Domestically-Oriented	Exporters	Importers	Two-way Traders
Log Output Per Worker	9.78 (9.81)	9.10 (9.14)	9.89 (9.99)	9.96 (10.03)	10.35 (10.42)
Log TFP	5.89 (5.90)	5.50 (5.53)	6.05 (6.15)	5.98 (5.99)	6.22 (6.16)
Log Sales	13.77 (13.83)	12.46 (12.48)	14.34 (14.45)	13.83 (13.89)	15.15 (15.18)
Log K/L	9.19 (9.31)	8.69 (8.81)	9.27 (9.46)	9.36 (9.47)	9.57 (9.74)
Log Employment	3.92 (3.81)	3.33 (3.18)	4.37 (4.28)	3.78 (3.74)	4.70 (4.61)
Log Average Wages	11.61 (11.64)	10.57 (10.61)	12.21 (12.27)	11.58 (11.59)	12.70 (12.70)
Log Profit Rate	2.61 (2.71)	2.63 (2.71)	2.82 (2.96)	2.62 (2.71)	2.49 (2.71)

The table reports the mean value of the performance indicators for all firms, domestically-oriented firms, exporters only, importers and two-way traders. Also reported in brackets are the median values.

In Table 3 we report results from mean comparison tests. The table reports results from a comparison of means for exporters only and non-exporters, importers only and non-importers and two-way traders and non two-way traders (a group which also includes exporters and importers only). To account for differences in the performance measures across sectors and countries we de-mean our performance measures, by constructing a variable equal to the logged value of the performance measure minus the mean of the logged value of performance of all

firms in the same country and sector. We also use this demeaning procedure when employing the non-parametric KS test below.

The results in Table 3 indicate that output per worker, TFP, sales, the capital-labour ratio, employment and average wages are higher for exporters and importers than for non-exporters and non-importers, with no significant differences found between the two groups for the profit rate. For two-way traders versus non two-way traders we also find that two-way traders have significantly higher means than non-two-way traders for output per worker, TFP, sales, the capital-labour ratio, employment and average wages, though the mean profit rate is found to be significantly higher for non-two-way traders.[15]

While the statistics and results reported in Tables 2 and 3 would seem to suggest that firms that trade internationally perform better than those that do not trade internationally the statistics only look at a maximum of two measures of the location of the distribution of the performance measures (i.e. the mean and median) and do not control for other firm-specific factors. In the following section therefore we report results that consider all moments of the distribution of the performance indicator and results from regression analysis that control for firm-specific variables.

[15] We also test for differences in the median of our performance measures across these groups using the Stata package '*cendif*'. The results are not reported for reasons of brevity, but are largely similar to those using the test of means.

Table 3: Mean Comparison Test Results on Demeaned Data

	Mean Value of the Demeaned Performance Indicator		Alternative Hypothesis		
	Traders	Non-Traders	Unequal Means	Difference favourable to traders	Difference favourable to non-traders
Exporters versus Non-Exporters					
Log Output Per Worker	0.0606	-0.1575	0.0188**	0.0094***	0.9906
Log TFP	0.1225	-0.1006	0.0256**	0.0128**	0.9872
Log Sales	0.2381	-0.3797	0.0000***	0.0000***	1.0000
Log K/L	0.1281	-0.1295	0.0273**	0.0136**	0.9864
Log Employment	0.1857	-0.2190	0.0000***	0.0000***	1.0000
Log Wage	0.2475	-0.2857	0.0000***	0.0000***	1.0000
Log Profit Rate	0.1499	0.0276	0.1596	0.0798*	0.9202
Importers versus Non-Importers					
Log Output Per Worker	0.1305	-0.3557	0.0000***	0.0000***	1.0000
Log TFP	0.0519	-0.1882	0.0001***	0.0001***	0.9999
Log Sales	0.0941	-0.6524	0.0000***	0.0000***	1.0000
Log K/L	0.1325	-0.3037	0.0000***	0.0000***	1.0000
Log Employment	-0.0591	-0.2704	0.0000***	0.0000***	1.0000
Log Wage	0.0309	-0.4579	0.0000***	0.0000***	1.0000
Log Profit Rate	0.0213	0.0600	0.3836	0.8082	0.1918
Two-way versus Non Two-way Traders					
Log Output Per Worker	0.3986	-0.1330	0.0000***	0.0000***	1.0000
Log TFP	0.2202	-0.0764	0.0000***	0.0000***	1.0000
Log Sales	0.9173	-0.3104	0.0000***	0.0000***	1.0000
Log K/L	0.2945	-0.1009	0.0000***	0.0000***	1.0000
Log Employment	0.5206	-0.1737	0.0000***	0.0000***	1.0000
Log Wage	0.6444	-0.2261	0.0000***	0.0000***	1.0000
Log Profit Rate	-0.1230	0.0412	0.0002***	0.9999	0.0001***

4. Results

In this section we report results from a number of statistical tests that examine whether trading firms perform better than non-trading firms. The section is split into three sub-sections, with each sub-section addressing a different issue. We begin by addressing the issue of whether firms with foreign exposure perform better than those without foreign exposure (Section 4.1), before examining whether there are differences in performance between firms with different types of foreign exposure, that is between importers, exporters and two-way trades (Sections 4.2), and finally we examine whether there are differences in performance between export starters, continuers and exiters (Section 4.3).

4.1. Do firms that trade internationally perform better than firms that do not?

We begin our analysis by searching for differences in our performance indicators between internationally trading firms and firms that sell in the domestic market only. This is achieved in three stages. In the first step we present results from the non-parametric KS test (where the performance measures are first demeaned by country-sector). The second step reports results from standard OLS regressions, where various fixed effects are included to account for country- and sector-specific heterogeneity. In the third step we report results from the robust QR and the fixed effects robust regression method of Verardi and Wagner (2012), which together provide results that are robust with respect to outlying observations and which in the case of QR allow us to consider the effect of international trade at different points on the (conditional) productivity distribution. When estimating the model using robust methods we concentrate on specifications where country-sector fixed effects are included in the model, using the approach of Canay (2011) in the case of QR and that of Verardi and Wagner (2012) in the case of the fixed effects robust regression.

Table 4 reports the results from the KS test. We begin by considering differences in performance between exporters and non-exporters, before moving on to consider importers and non-importers, and two-way traders and non-two-way traders. In the case of two-way traders the comparison is with all firms that are non two-way traders, which means that the comparison group will also include importers and exporters only. We examine this distinction further below examining whether there are differences in productivity between exporters only, importers only and two-way traders. In this table we report the results from both one-sided tests, i.e. the test that trading firms dominate non-trading firms and that non-trading firms dominate trading firms.

Table 4: Foreign Exposure and Firm-Level Productivity – Kolmogorov-Smirnov Test Results

Group 1 vs. Group 2	Null Hypothesis		
	Equality of Distribution	Differences favourable to traders	Differences favourable to non-traders
Exporters vs. Non-Exporters			
Log Output Per Worker	0.125	0.975	0.062*
Log TFP	0.018**	0.980	0.009***
Log Sales	0.000***	0.973	0.000***
Log Capital-Labour Ratio	0.098*	0.983	0.049**
Log Employment	0.000***	0.993	0.000***
Log Wage	0.000***	0.997	0.000***
Log Profit Rate	0.041**	0.729	0.020**
Importers vs. Non-Importers			
Log Output Per Worker	0.000***	1.000	0.000***
Log TFP	0.001***	1.000	0.001***
Log Sales	0.000***	0.998	0.000***
Log Capital-Labour Ratio	0.000***	0.936	0.000***
Log Employment	0.000***	0.846	0.000***
Log Wage	0.000***	1.000	0.000***
Log Profit Rate	0.071*	0.036**	0.372
Two-Way vs. Non-Two-Way Traders			
Log Output Per Worker	0.000***	0.999	0.000***
Log TFP	0.000***	1.000	0.000***
Log Sales	0.000***	1.000	0.000***
Log Capital-Labour Ratio	0.000***	1.000	0.000***
Log Employment	0.000***	0.999	0.000***
Log Wage	0.000***	1.000	0.000***
Log Profit Rate	0.003***	0.002***	1.000

Notes: Reported in the table are the p-values from the KS test. ***, ** and * indicate significance at the 1, 5, and 10 percent levels.

The results for exporting firms in Table 4 indicate that there are no significant differences between exporters and non-exporters when considering labour productivity, but that significant differences in performance between the two groups exist for all other performance measures. In all such cases we cannot reject the null hypothesis that the difference is favourable to traders, implying that the distribution of the exporting group stochastically dominates that of the non-exporting group for all performance measures except labour productivity. The results of the comparison of importers and non-importers and two-way traders and non-two-way traders are found to be very similar. The results indicate that there are significant differences in the distributions of the trading and non-trading groups for all performance measures. These differences are found to favour the trading groups (i.e. importers or two-way traders) in all cases except for the profit rate, for which the distribution of non-traders dominates that of traders. Overall, the results are found to support those when considering the mean comparison tests, and

indicate that there does tend to be significant differences in our performance measures between traders and non-traders, and that in the majority of cases these differences tend to favour the firms that trade internationally.

Table 5 reports regression results from estimating Equation (1) using OLS. The table reports results when including a number of different fixed effects, with Column (1) including no country or sector fixed effects, Column (2) including country and sector fixed effects separately, and Column (3) including sector-country fixed effects. The final three columns report similar results but also include a dummy variable equal to one if the firm is foreign-owned. We control for foreign ownership since foreign-owned firms have been found to perform better than domestically-owned ones, and in our dataset are more likely to be internationally trading firms. The results on employment and employment squared are largely consistent with existing literature and indicate that labour productivity rises with firm size, but at a diminishing rate. Firm age is found to have a positive effect on productivity when significant, while the foreign dummy is large positive and significant. The coefficients on the capital-labour ratio and the measure of human capital are also consistently positive and significant as would be expected.

Turning to the trade variables we find coefficients on the exporter, importer and two-way dummy variables that are large positive and significant in all cases. There seems to be a clear pattern in the results with exporters having the smallest coefficient and two-way traders the largest. The size of the estimated productivity premia are found to be large when compared with other results in previous studies, particularly existing studies of developed countries. For two-way traders the premia is found to be between 79% and 113%, with the premia for exporters

only and importers only being between 36% and 64%.[16] Tests of the equality of these coefficients indicate that there is no significant difference in productivity between importers only and exporters only, but that there are significant differences between two-way traders and both exporters only and importers only.

Table 6 reports results from estimating a similar model using the fixed effects QR estimator of Canay (2011) and the fixed effects robust regression of Verardi and Wagner (2012). QR results are reported for the 10th, 30th, 50th (i.e. median), 70th and 90th percentiles of the conditional productivity distribution. Results on the control variables are largely similar to those when using OLS in terms of sign and significance, though firm size tends not to be a significant determinant of productivity. We also find that the impact of foreign ownership tends to be largest for over-achievers. Coefficients on the trade dummies however are largely consistent with those from the OLS results as is the ranking in terms of the size of the coefficients, though the differences in coefficients are often not significant at lower quantiles. The size of the coefficients is generally smaller however, both at the median and other percentiles when compared with the OLS results, with the coefficients on the exporter dummy being insignificant at the higher quantiles. The coefficients at the median are more in line with existing estimates indicating an exporter premium of around 20%. Interestingly the coefficients tend to be largest for under-achievers, with the coefficients also being relatively large for over-achievers for two-way traders. Results from the robust fixed effects regression are largely similar to the OLS results in terms of the control variables in terms of both the size and significance of the coefficients. Coefficients on the trade dummies are all positive and significant and display a similar pattern to the OLS results. Coefficients tend to be somewhat smaller than the OLS results however, suggesting a premia from trading of 28% for exporters, rising to 38% for importers and 63% for two-way traders.

[16] The premia are calculated from the estimated coefficients on the trade dummies as $100(e^{\beta} - 1)$, where β is the estimated coefficient.

Table 5: OLS Results for Exporters, Importers and Two-Way Traders

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln EMP$	0.507***	0.423***	0.446***	0.456***	0.367***	0.397***
	(0.0841)	(0.0943)	(0.0998)	(0.0851)	(0.0960)	(0.101)
$\ln EMP^2$	-0.0528***	-0.0373***	-0.0409***	-0.0507***	-0.0343***	-0.0382***
	(0.0100)	(0.0111)	(0.0117)	(0.0101)	(0.0112)	(0.0118)
AGE	0.00426**	0.00119	0.000662	0.00554***	0.00230	0.00171
	(0.00174)	(0.00170)	(0.00184)	(0.00175)	(0.00173)	(0.00187)
K/L	0.451***	0.412***	0.407***	0.440***	0.402***	0.398***
	(0.0186)	(0.0209)	(0.0218)	(0.0183)	(0.0207)	(0.0217)
HK	0.00740***	0.00729***	0.00779***	0.00751***	0.00732***	0.00782***
	(0.00143)	(0.00138)	(0.00143)	(0.00141)	(0.00137)	(0.00142)
EXP	0.468***	0.437***	0.370***	0.357***	0.378***	0.308***
	(0.103)	(0.102)	(0.112)	(0.102)	(0.101)	(0.111)
IMP	0.497***	0.418***	0.411***	0.424***	0.376***	0.370***
	(0.0638)	(0.0702)	(0.0731)	(0.0628)	(0.0694)	(0.0724)
$TWOWAY$	0.757***	0.659***	0.665***	0.617***	0.587***	0.593***
	(0.0776)	(0.0851)	(0.0922)	(0.0787)	(0.0849)	(0.0916)
FOR				0.448***	0.348***	0.343***
				(0.0584)	(0.0599)	(0.0639)
Sector and Country Fixed Effects	No	Yes	No	No	Yes	No
Sector-Country Fixed Effects	No	No	Yes	No	No	Yes
$EXP = IMP$	0.7696	0.8493	0.6960	0.4874	0.9765	0.5586
$EXP = TWOWAY$	0.0046***	0.0202**	0.0038***	0.0090***	0.0269**	0.0049***
$IMP = TWOWAY$	0.0002***	0.0016***	0.0022***	0.0066***	0.0055***	0.0069***
Premia (%)						
EXP	59.68	54.81	44.77	42.90	45.94	36.07
IMP	64.38	51.89	50.83	52.81	45.64	44.77
$TWOWAY$	113.19	93.29	94.45	85.34	79.86	80.94
Observations	2,671	2,671	2,671	2,671	2,671	2,671
F-Statistic	161.82***	46.67***	7.38***	153.93***	46.83***	7.56***
R-squared	0.353	0.421	0.496	0.368	0.429	0.503

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Quantile Regression Results for Exporters, Importers and Two-Way Traders

	(1) 10th	(2) 30th	(3) 50th	(4) 70th	(5) 90th	(6) Robust FE
$\ln EMP$	0.0430	0.1120	0.0742	-0.0630	-0.0652	0.375***
	(0.1784)	(0.1575)	(0.1473)	(0.1075)	(0.1589)	(0.0964)
$\ln EMP^2$	-0.0048	-0.0056	-0.0035	0.0159	0.0163	-0.0350***
	(0.0191)	(0.0188)	(0.0150)	(0.0133)	(0.0192)	(0.0112)
AGE	0.0037	0.0000	-0.0007	-0.0019	-0.0035	0.00230
	(0.0043)	(0.0027)	(0.0025)	(0.0027)	(0.0033)	(0.00179)
K/L	0.278***	0.257***	0.280***	0.267***	0.306***	0.401***
	(0.0523)	(0.0229)	(0.0246)	(0.0228)	(0.0303)	(0.0187)
HK	0.0019	0.0030	0.00348*	0.006***	0.00834***	0.00713***
	(0.0040)	(0.0020)	(0.0019)	(0.0023)	(0.0026)	(0.00132)
EXP	0.409*	0.305*	0.1970	0.2120	0.1000	0.249**
	(0.2190)	(0.1632)	(0.1576)	(0.1803)	(0.2265)	(0.104)
IMP	0.447**	0.409***	0.266**	0.307***	0.206*	0.326***
	(0.1862)	(0.0789)	(0.1104)	(0.0926)	(0.1166)	(0.0675)
$TWOWAY$	0.572***	0.437***	0.372***	0.416***	0.428***	0.490***
	(0.1875)	(0.0979)	(0.1176)	(0.1253)	(0.1270)	(0.0824)
FOR	0.1800	0.1030	0.198**	0.264***	0.370***	0.258***
	(0.1397)	(0.1034)	(0.0884)	(0.0815)	(0.1476)	(0.0574)
$EXP = IMP$	0.8480	0.3095	0.4500	0.3130	0.5761	0.4303
$EXP = TWOWAY$	0.4247	0.2079	0.0620*	0.0370**	0.0910*	0.0096***
$IMP = TWOWAY$	0.3618	0.6870	0.0943*	0.0994*	0.0882*	0.0242**
Premia (%)						
EXP	50.53	35.66	21.77	23.61	10.52	28.27
IMP	56.36	50.53	30.47	35.93	22.88	38.54
$TWOWAY$	77.18	54.81	45.06	51.59	53.42	63.23
Observations	2,671	2,671	2,671	2,671	2,671	2,614

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.2. Are there differences in performance between two-way traders and importers only and exporters only?

In the more recent literature on international trade and firm-level performance attention has been paid to the issue of whether there are productivity differences between different types of trading firms, and in particular between exporters only, importers only and two-way traders (see Wagner, 2012). Results from existing studies tend to indicate a clear ranking in terms of performance by trading type, with two-way traders having the highest levels of productivity, followed by importers only and then exporters only. This is confirmed to an extent in the above regression analysis where we observe a significant difference in productivity between two-way traders and exporters only and importers only. In this sub-section we examine this issue further

by reporting results from the KS test, again reporting results from all of our performance indicators and not just labour productivity.

The KS results that are reported in Table 7 and here we find that there tends to be significant differences in the performance distributions of both importers only and exporters only compared with two-way traders (exceptions being TFP and the capital-labour ratio when considering the comparison between exporters only and two-way traders). In the vast majority of cases we find that we cannot reject the null hypothesis that the differences in the distributions are favourable to two-way traders, or in other words the performance distributions of two-way traders dominates those of exporters only and importers only. The exception to this is for the profit rate, for which we find that exporters only and importers only dominate two-way traders. When comparing importers only and exporters only we find fewer significant differences, with differences being significant in the cases of output per worker, the capital-labour ratio, employment and wages. The results indicate that exporters only dominate in the case of output per worker, with importers only dominating in the cases of the capital-labour ratio, employment and wages.

Table 7: Productivity Differences between Two-Way Traders and Exporters and Importers Only

Group 1 vs. Group 2	Equality of Distribution	Differences favourable to Group 1	Differences favourable to Group 2
Exporters vs. Two Way Traders			
Log Output Per Worker	0.007***	0.003***	0.999
Log TFP	0.892	0.512	0.547
Log Sales	0.000***	0.000***	1.000
Log Capital-Labour Ratio	0.270	0.135	0.942
Log Employment	0.000***	0.000***	0.989
Log Wage	0.001***	0.001***	0.986
Log Profit Rate	0.001***	0.958	0.000***
Importers vs. Two Way Traders			
Log Output Per Worker	0.001***	0.000***	0.998
Log TFP	0.042**	0.021**	1.000
Log Sales	0.000***	0.000***	1.000
Log Capital-Labour Ratio	0.031**	0.015**	0.836
Log Employment	0.000***	0.000***	0.998
Log Wage	0.000***	0.000***	0.935
Log Profit Rate	0.044**	0.999	0.022**
Exporters vs. Importers			
Log Output Per Worker	0.084*	0.042**	0.589
Log TFP	0.298	0.860	0.149
Log Sales	0.461	0.802	0.233
Log Capital-Labour Ratio	0.487	0.247	0.478
Log Employment	0.011**	0.993	0.006***
Log Wage	0.021**	0.948	0.011**
Log Profit Rate	0.018**	0.744	0.009***

Notes: Reported in the table are the p-values from the KS test. ***, ** and * indicate significance at the 1, 5, and 10 percent levels.

4.3. Are there differences in performance between export starters, exiters and continuers?

While there are only limited data on past performance and status in the AIS, the dataset does include information on export status in the previous period. From this data we are able to construct variables indicating whether firms began exporting, continued exporting or stopped exporting in the survey year. We are thus able to ask whether there are differences in performance between export starters, continuers and exiters. The coefficient on the export starter dummy allows us to examine whether there are pre-entry differences between non-exporters and future exporters, while that on the export exiter dummy allows us to examine whether stopping exporting is negatively correlated with productivity.

To examine whether there are differences in productivity between export starters, continuers and exiters we follow the same steps as above. Initially, in Table 8 we report results from the KS test

where we look at all performance indicators. The results indicate that there are no significant differences in the performance distributions of export starters and exiters, but that there are differences between export continuers and both starters and exiters. In the case of starters versus continuers we find significant differences in the distributions for all performance indicators except the profit rate. Interestingly, we find that in all cases the distribution of continuers dominates that of starters, suggesting that established exporters perform better than new exporters. In the case of exiters versus continuers we find significant differences in the distributions for output per worker, TFP, sales and the capital-labour ratio. Again, the results indicate that in these cases the distributions of continuers dominate those of exiters. The result that continuers perform better than exiters is consistent with results found by Girma et al (2003) who argue that such results imply that domestic output does not compensate for the loss of foreign market share.

Table 8: Productivity Differences between Export Starters, Continuers and Exiters

Group 1 vs. Group 2	Equality of Distribution	Differences favourable to Group 1	Differences favourable to Group 2
Export Starter vs. Continuing Exporter			
Log Output Per Worker	0.013**	0.006***	0.841
Log TFP	0.004***	0.002***	0.754
Log Sales	0.003***	0.002***	0.999
Log Capital-Labour Ratio	0.029**	0.014**	0.974
Log Employment	0.000***	0.000***	0.989
Log Wage	0.001***	0.000***	0.998
Log Profit Rate	0.808	0.589	0.441
Export Exiter vs. Continuing Exporter			
Log Output Per Worker	0.076*	0.038**	0.893
Log TFP	0.019**	0.010**	0.984
Log Sales	0.044**	0.022**	0.939
Log Capital-Labour Ratio	0.051*	0.025**	0.987
Log Employment	0.191	0.096*	0.987
Log Wage	0.698	0.367	0.710
Log Profit Rate	0.555	0.667	0.284
Export Exiter vs Export Starter			
Log Output Per Worker	0.761	0.408	0.724
Log TFP	0.513	0.261	0.896
Log Sales	0.921	0.544	0.913
Log Capital-Labour Ratio	0.473	0.240	0.761
Log Employment	0.995	0.866	0.705
Log Wage	0.768	0.981	0.413
Log Profit Rate	0.462	0.450	0.234

Notes: Reported in the table are the p-values from the KS test. ***, ** and * indicate significance at the 1, 5, and 10 percent levels.

Finally, we examine whether the results found using the KS test and from the comparison of the distributions hold in a regression framework, where other covariates are controlled for. Results from OLS regressions are reported in Table 9 with quantile and robust fixed effects regression results reported in Table 10. Results on the control variables in Table 9 are largely consistent with those found above. Turning to the exporter variables we observe that across the different specifications there is an insignificant coefficient on the export exiter dummy. As such, export exiters are not found to perform differently to non-exporters. For export starters and continuers however, we tend to find coefficients that are positive and significant. The coefficients tend to be somewhat larger in magnitude for export continuers than for export starters, though the differences in the coefficients are never significant. When considering the quantile regression results (Table 10) we find insignificant coefficients for both export starters (except at the 50th percentile) and export exiters, with positive and significant coefficients found for export continuers at all quantiles except for the 10th and 90th percentiles (i.e. the largest under- and over-performers). Once again however, these differences in coefficients are not found to be significant. Finally, results from the robust fixed effects regression are consistent with the OLS results and indicate a positive and significant coefficient for export continuers, with positive but insignificant coefficients found for export exiters and starters.

Table 9: OLS Results for Export Starters, Exiters and Continuers

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln EMP$	0.507***	0.425***	0.444***	0.457***	0.370***	0.395***
	(0.0847)	(0.0947)	(0.100)	(0.0855)	(0.0963)	(0.102)
$\ln EMP^2$	-0.0528***	-0.0374***	-0.0406***	-0.0507***	-0.0345***	-0.0379***
	(0.0100)	(0.0111)	(0.0117)	(0.0101)	(0.0112)	(0.0118)
AGE	0.00420**	0.00119	0.000657	0.00549***	0.00229	0.00169
	(0.00175)	(0.00171)	(0.00184)	(0.00175)	(0.00173)	(0.00187)
K/L	0.451***	0.413***	0.409***	0.441***	0.403***	0.400***
	(0.0186)	(0.0209)	(0.0218)	(0.0184)	(0.0207)	(0.0216)
HK	0.00741***	0.00731***	0.00779***	0.00752***	0.00734***	0.00782***
	(0.00143)	(0.00138)	(0.00143)	(0.00141)	(0.00137)	(0.00142)
$START$	0.260*	0.256*	0.274*	0.174	0.206	0.227
	(0.157)	(0.155)	(0.163)	(0.154)	(0.152)	(0.160)
$CONTINUE$	0.421***	0.403***	0.344***	0.311***	0.345***	0.289***
	(0.0968)	(0.0967)	(0.107)	(0.0970)	(0.0970)	(0.107)
$EXIT$	0.325	0.280	0.297	0.240	0.212	0.213
	(0.222)	(0.234)	(0.237)	(0.223)	(0.228)	(0.231)
IMP	0.471***	0.393***	0.390***	0.402***	0.353***	0.353***
	(0.0635)	(0.0690)	(0.0714)	(0.0626)	(0.0682)	(0.0707)
$TWOWAY$	0.355***	0.274***	0.330***	0.318***	0.257***	0.313***
	(0.0952)	(0.0902)	(0.100)	(0.0934)	(0.0893)	(0.0996)
FOR				0.448***	0.347***	0.342***
				(0.0588)	(0.0601)	(0.0642)
$START = CONTINUE$	0.2641	0.3051	0.6253	0.3299	0.3235	0.6618
$START = EXIT$	0.8095	0.9298	0.9343	0.8059	0.9844	0.9600
$EXIT = CONTINUE$	0.6896	0.6257	0.8532	0.7649	0.5874	0.7653
Observations	2,671	2,671	2,671	2,671	2,671	2,671
F-Statistic	131.07***	45.11***	7.33***	127.63***	45.26***	7.50***
R-squared	0.352	0.421	0.496	0.367	0.429	0.503

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Quantile Regression Results for Export Starters, Exiters and Continuers

	(1) 10th	(2) 30th	(3) 50th	(4) 70th	(5) 90th	(6) Robust FE
$\ln EMP$	0.387**	0.442***	0.416***	0.461***	0.322*	0.379***
	(0.1911)	(0.1330)	(0.1351)	(0.1159)	(0.1716)	(0.0967)
$\ln EMP^2$	-0.0337	-0.045***	-0.0477***	-0.0509***	-0.0373*	-0.0353***
	(0.0225)	(0.0163)	(0.0147)	0.0126)	(0.0211)	(0.0113)
AGE	0.0043	0.00709***	0.00761***	(0.00511*	0.0034	0.00220
	(0.0048)	(0.0024)	(0.0021)	0.0029)	(0.0033)	(0.00180)
K/L	0.442***	0.438***	0.429***	(0.463***	0.442***	0.401***
	(0.0501)	(0.0289)	(0.0243)	(0.0258)	(0.0314)	(0.0188)
HK	0.0041	0.00680***	0.00764***	0.00874***	0.0110***	0.00708***
	(0.0038)	(0.0022)	(0.0017)	(0.0020)	(0.0026)	(0.00133)
$START$	0.0417	0.0885	0.348*	0.1830	0.0669	0.169
	(0.4013)	(0.3315)	(0.1923)	(0.2390)	(0.4233)	(0.147)
$CONTINUE$	0.2270	0.296*	0.410***	0.301*	0.2740	0.256**
	(0.2462)	(0.1738)	(0.1611)	(0.1794)	(0.1685)	(0.101)
$EXIT$	0.3730	0.0042	0.1550	0.2050	0.2230	0.125
	(0.4008)	(0.4082)	(0.5488)	(0.4473)	(0.4096)	(0.198)
IMP	0.439***	0.384***	0.463***	0.325***	0.314***	0.317***
	(0.1491)	(0.0927)	(0.1044)	(0.0988)	(0.1195)	(0.0657)
$TWOWAY$	0.2840	0.2040	0.2180	0.245*	0.2980	0.260***
	(0.2342)	(0.1878)	(0.1586)	(0.1388)	(0.1843)	(0.0930)
FOR	0.321***	0.480**	0.467**	0.459*	0.507*	0.255***
	(0.1233)	(0.2166)	(0.2189)	(0.2331)	(0.2684)	(0.0577)
$START = CONTINUE$	0.4213	0.1547	0.6544	0.4035	0.2347	0.5007
$START = EXIT$	0.5186	0.7993	0.5392	0.9446	0.6852	0.8542
$EXIT = CONTINUE$	0.7565	0.3407	0.3802	0.7443	0.8863	0.5515
Observations	2,671	2,671	2,671	2,671	2,671	2,614

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Summary and Conclusions

This paper adds to the firm-level literature on international trade and performance using a recent and broad survey of SSA firms and by providing the first evidence of the relationship between firm-level performance and importing for SSA firms. Our results indicate that exporters, importers and two-way traders perform better than non-exporters, non-importers and non two-way traders respectively. We further find that two-way traders perform better than importers only and exporters only, though there are few significant differences between importers only perform and exporters only.

Results from the various statistical tests used also provide some evidence indicating that export-continuers perform better than export starters and exiters across many of the performance criteria. In the regression analysis, we also find that the size of the premia for continuing exporters is often found to be larger than that for starters (and exiters), though the differences in coefficients are never found to be significant. Export exiters are usually found to have productivity levels that are not significantly different to non-exporters. Such results are consistent with the view that established exporters perform better than new exporters, and that domestic sales are not able to compensate for the loss of foreign market share. Overall the results point to a positive relationship between a firm's exposure to international trade and its productivity performance, which suggests that policies that encourage international exposure should be promoted.

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Appendix

Table A1: Number of Firms in Sample by Country

Country	No. of Firms (% of Total)	Exporter	Importer	Two-way Trader	Foreign Owned
Burkina Faso	47 (1.64)	5	12	15	14
Burundi	42 (1.46)	5	11	11	13
Cameroon	80 (2.79)	5	24	30	35
Cape Verde	89 (3.1)	1	45	11	22
Ethiopia	364 (12.68)	17	194	53	76
Ghana	225 (7.84)	18	82	50	87
Kenya	324 (11.29)	46	70	156	190
Lesotho	75 (2.61)	4	25	41	45
Madagascar	99 (3.45)	25	17	40	50
Malawi	62 (2.16)	8	29	14	16
Mali	133 (4.63)	3	25	26	28
Mozambique	110 (3.83)	0	98	8	57
Niger	35 (1.22)	1	20	3	7
Nigeria	340 (11.85)	18	91	25	80
Rwanda	74 (2.58)	8	33	20	20
Senegal	87 (3.03)	13	17	36	30
Tanzania	250 (8.71)	27	70	51	84
Uganda	297 (10.35)	30	69	97	133
Zambia	137 (4.77)	7	53	31	39
Total	2,870 (100)	241	985	718	1026

Table A2: Number of Firms in Sample by Industry

Industry	No. of Firms (% of total)	Exporter	Importer	Two-way Trader	Foreign Owned
Manufacture of food products and beverages	610 (21.25)	71	143	139	187
Manufacture of tobacco products	19 (0.66)	5	6	8	15
Manufacture of textiles	112 (3.9)	15	29	38	39
Manufacture of wearing apparel; dressing and dyeing of fur	177 (6.17)	24	36	72	79
Tanning and dressing of leather; manufacture of luggage, handbags, saddler, harness and footwear	83 (2.89)	9	17	47	26
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	119 (4.15)	14	25	26	31
Manufacture of paper and paper products	90 (3.14)	9	29	22	33
Publishing, printing and reproduction of recorded media	240 (8.36)	11	98	26	38
Manufacture of coke, refined petroleum products and nuclear fuel	11 (0.38)	2	1	6	8
Manufacture of chemicals and chemical products	268 (9.34)	17	104	92	125
Manufacture of rubber and plastics products	255 (8.89)	15	112	79	124
Manufacture of other non-metallic mineral products	151 (5.26)	4	55	15	47
Manufacture of basic metals	74 (2.58)	7	30	19	37
Manufacture of fabricated metal products, except machinery and equipment	300 (10.45)	9	155	47	101
Manufacture of machinery and equipment n.e.c.	81 (2.82)	4	34	18	27
Manufacture of office, accounting and computing machinery	2 (0.07)	0	1	1	2
Manufacture of electrical machinery and apparatus n.e.c.	45 (1.57)	2	20	14	24
Manufacture of radio, television and communication equipment and apparatus	7 (0.24)	0	3	4	6
Manufacture of medical, precision and optical instruments, watches and clocks	15 (0.52)	1	6	5	6
Manufacture of motor vehicles, trailers and semi-trailers	27 (0.94)	4	12	7	12
Manufacture of other transport equipment	14 (0.49)	1	5	5	5
Manufacture of furniture; manufacturing n.e.c.	160 (5.57)	14	60	26	48
Recycling	10 (0.35)	3	4	2	6
Total	2,870 (100)	241	985	718	1026

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