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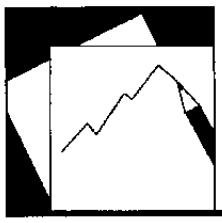

IMF Working Paper

Export Orientation and Productivity in Sub-Saharan Africa

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Export Orientation and Productivity in Sub-Saharan Africa

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Abstract

Analysis of firm-level panel data from three sub-Saharan African economies shows that exporting manufacturers have a total factor productivity premium of 11–28 percent. The data do not allow testing of whether these premiums are caused by selection of more efficient producers into exporting or by learning-by-exporting. By thinking about the mechanisms behind selectivity and learning, however, our finding of higher premiums for direct exporters and exporters to outside Africa could be interpreted as being consistent with learning-by-exporting effects. However, if learning-by-exporting is indeed present in the data, we cannot disentangle its effect on productivity from those of more traditionally recognized channels of international technology diffusion.

JEL Classification Numbers: D21, D24, L60 and O12.

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I. INTRODUCTION

A recent World Bank report argues that greater export orientation of manufacturing industries should be promoted as an important element of the growth strategy of Sub-Saharan Africa (World Bank, 2000). The argument is partly premised on the idea that exporting leads to productivity gains. At the same time there is advice that seems to be a call for public intervention to help raise the productivity of potential exporters to the entry thresholds of international markets through investment programs and policy reforms aimed at reducing the transaction costs of foreign trade. Both themes hinge on the relative productivity of exporters. Among African manufacturers are exporters more productive than non-exporters? And if so, does this mean that there are productivity gains from exporting? Or, is the higher productivity of exporters a measure of an international competitiveness gap of non-exporters that governments may be able to help them bridge?

In this paper, we analyze data on samples of manufacturing firms from three countries in the region with the aim of estimating the productivity premium of exporters while controlling for the import-intensity of inputs and the incidence or strength of other forms of foreign links. The data is from the manufacturing sectors in Ethiopia, Ghana, and Kenya, which, between them, seem to adequately capture the diversity of the region's economies in terms of the size and export orientation of the manufacturing sector. With as many as 25 percent of establishments engaged in the export business, Kenya has one of the most export-oriented manufacturing sectors in the region, while Ethiopia, with only 3 percent of establishments producing for export markets, represents countries in the region where manufacturing is almost entirely confined to import substitution. Ghana represents countries in between these extremes, with about 10 percent of manufacturing establishments producing for export.

All previous studies in developed and developing economies alike detect a positive productivity premium of exporters.[2] One possible explanation of the premium is that it may reflect the self selection of more efficient producers into export markets. Although the mechanisms behind this selectivity hypothesis are often not specified, it may be that firms face difficulties in accessing export markets that do not arise when they supply domestic markets, which are typically protected from foreign competition by a combination of distance and trade policy.[3]

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[2] Examples from the most recent among these include Aw and Hwang (1995) on Taiwan, Tybout and Westbrook (1995) on Mexico, Bernard and Jensen (1997) on the US, Clerides et al. (1998) on three middle income developing countries, Kraay (1998) on China, and Bigsten et al. (1999) on four African economies.

[3] The hypothesis is an implication of the theory of the evolution of a competitive industry of technologically heterogeneous producers as developed in Jovanovic (1982) and Hopenhayn (1992). Bernard et al. (2000) derive it in a static trade model of technologically heterogeneous producers under a regime of monopolistic competition.

Recently there have been attempts at testing a second explanation of the premium, namely, that exporting itself leads to a productivity gain. The gain could be due to economies of scale possible only by a production scale larger than for the small domestic market (Pack, 1988). It could also be a result of "learning-by-exporting," that is, a process of relatively inexpensive flow of technical information to exporters from their developed country clients that eventually translates to lower unit costs or improvement in product quality (Clerides et al., 1998; Pack and Sajji, 1999). The evidence on whether or not productivity grows as a result of involvement in export markets has so far been mixed. Clerides et al. (1998) on data from three developing countries, Bernard and Jensen (1997) on data from the U.S., and Liu et al. (1999) on data from Taiwan find no evidence that participation in export markets generates growth in productivity. On the other hand, both Kraay (1998), using Chinese data, and Bigsten et al. (1999), using data pooled across four Sub-Saharan African countries, detect post-entry productivity growth of exporters, which they interpret as evidence for "learning-by-exporting."

Regardless of if and how the productivity premium of exporters is divided between a learning and a selection component, its measurement is a useful exercise since it provides an upper bound to either component. Still, the aim in this paper extends beyond estimating the premium. Unfortunately, because we do not have long enough time series, the data does not allow a formal causality test: whether the productivity premium of exporters is caused by self-selection or learning by exporting. Instead, we have chosen a different route: comparison of the total factor productivity of two particular sub-groups of exporters with other exporters. The first of these consists of direct exporters, that is, exporters who are in direct contact with their foreign clients rather than supplying international markets through domestic intermediaries. The second sub-group consists of those who directly export to destinations outside of Africa as opposed to those confined to markets within the region.

Thus in Section IV, the paper compares the productivity of direct and indirect exporters, and of exporters to outside of Africa and within the region. The idea is that looking at different types of exporters forces us to think more carefully about the mechanisms underlying the selection and learning- by-exporting hypotheses. By thinking about how selectivity and learning by exporting actually work, it may be that certain findings on the relative productivity of the sub-groups can provide evidence supporting the existence of particular explanations for the premium.

The learning-by-exporting hypothesis naturally highlights the need for controlling for the effects of more traditionally recognized channels of international technology diffusion in measuring the productivity premium of exporters. These include direct foreign investment, international licensing of processes, international technical assistance arrangements, and the import of physical inputs in which new technical knowledge may be embodied. Although both exporting and non-exporting firms are involved in some or all of these in the data, it is clear that their average incidence or intensity is higher for

exporters. Accurate measurement of productivity gains from exporting therefore requires controlling for differences in productivity changes that may arise from these other sources.

Having estimated an error-components production function with random firm effects, we find that for exporting manufacturers total factor productivity is 16 percent higher than that of non-exporters using observations pooled across the three countries. This average conceals large inter-country differences in the productivity premium of exporters. At about 11 percent, the premium for Ghanaian exporters is lower than the average, while it is far higher for Kenyan exporters at about 28 percent. We also find that the estimated average productivity premium for exporters as a whole clearly underestimates the average premium for direct exporters. Indeed, the estimated productivity premium for indirect exporters is not statistically significant. On the other hand the premium for direct exporters is about 24 percent with observations pooled over the three countries, 33 percent for the Kenyan sample only, and 13 percent for the Ghanaian sample. Moreover, the average productivity premium of direct exporters itself underestimates the average for those exporting to destinations outside of Africa. For the entire sample, the productivity premium of direct exporters to outside of Africa is 35 percent, relative to non-exporters which suggests a premium of 11 percent for exporting outside of the region relative to direct exporting within the region. For Ghana, the premium for direct exporters to outside of the region over non-exporters is much lower (16 percent) than the average, but much higher for Kenya (58 percent).

These estimates are all based on controls for degree of competition from imports, the import content of intermediate inputs, foreign equity participation, foreign licensing and technical assistance arrangements with foreign partners. However, contrary to findings for other developing regions, none of these variables enters significantly in the estimated productivity equations. This seems due to the high collinearity of the variables with exporting status rather than because they do not influence productivity. The reason for this conclusion is that while all the variables enter an estimated export participation equation significantly, the productivity premium of exporters all but disappears when establishments with such foreign links are excluded from the subsample of exporters used in estimating production functions. Our interpretation is not that the premium would not exist once we control for other forms of foreign links, but that it is difficult in this particular case to disentangle the influence of exporting activity on productivity from that of other mechanisms of the international technology diffusion.

The remainder of the paper is organized as follows. Section II outlines a model that illustrates how selection and learning effects lead to a productivity premium of exporters. Section III discusses the data and the econometric framework. Details of the results are given in Section IV, and conclusions in Section V.

II. MODEL

The first step in thinking about how self-selection and learning-by-exporting can result in higher productivity of exporters is to consider a simple model, such as the one presented in Clerides et al. (1998). They begin by assuming monopolistic competition, so that each firm faces a downward sloping demand curve. If marginal costs (c) do not depend on output, gross operating profits can be written as $\pi(c, z)$, where the random variable z captures demand shifters such as foreign income level, exchange rates and other goods prices. Next, they let M represent the per-period fixed costs of being an exporter, i.e. costs of dealing with customs and other intermediaries. Then, firms would choose to export whenever $\pi(c, z) > M$, since they would earn positive net operating profits. This formulation indicates that all firms with marginal costs below some threshold value would self-select into exporting. Since lower marginal costs mean higher productivity, exporters will have higher productivity than non-exporters simply because the more efficient firms self-select into exporting. Note that how low marginal costs have to be (or how high productivity must be) for firms to self-select into export markets depends on the value of M, the per-period fixed costs of being an exporter.

Next, the model considers sunk entry costs, since microeconomic evidence has suggested these costs are important for firms trying to break into the export market. If an entry cost F is incurred every time a firm enters or reenters the export market, then it may be optimal to continue exporting even when $\pi(c, z) < M$, since by remaining in the export market while marginal costs are temporarily high or foreign demand conditions temporarily bad, the firm avoids paying future reentry costs. Thus, producers face a dynamic optimization problem, and it is necessary to specify how z and c evolve. Clerides et al. assume z follows a plant-specific serially correlated process, while $c = g(w_t, c_{t-1}, y_{t-1})$ where w_t is a vector of exogenous factors affecting costs, c_{t-1} is the vector of previous realizations of c, and y_{t-1} is the history of the binary variable indicating whether a firm was exporting or not.

Learning-by-exporting is built into the model here by assuming that marginal costs are a decreasing function of a firm's past participation in exporting activities. Being an exporter in previous periods lowers a firm's marginal costs and therefore increases productivity. The idea is that exporters learn from their contacts in the export market, for example by benefiting from production or managerial advice involved in supplier specifications.

Because of the sunk entry costs the decision of whether to enter the export market today is a forward-looking choice. The dynamic optimization problem implies firms export whenever:

$$\pi(c, z) - M + \delta\{E_t(V_{t+1}|y_t = 1) - E_t(V_{t+1}|y_t = 0)\} > F(1 - y_{t-1})$$

According to this condition firms enter the export market when current net operating profits plus the expected future discounted payoff from exporting is greater than start-up costs. It is important to note that expected future payoffs include both the value of avoiding start-up costs in the future, plus efficiency gains from learning by exporting.

This set-up illustrates the mechanisms that generate exporter's efficiency premiums both due to selection and due to learning effects. In terms of our interest in this paper though, all exporters are similar—that is, there is no difference between different types of exporters or exporting to alternative destinations. However, it is straightforward to think how the problem would be modified if we were to model the choice between being a direct exporter or an indirect exporter, and between exporting to destinations outside Africa or to within the region. First, we could imagine that the per period fixed costs would be different, so that we could let M_D and M_I represent flow fixed costs for direct and indirect exporters and M_{OA} and M_A stand for flow fixed costs for exporters to outside and within Africa. We discuss below reasonable assumptions about the relative size of these costs. Second, regarding sunk entry costs, it again appears reasonable that these costs may be different for each sub-group of exporters. Third, it is likely that the learning-by-exporting effects (where past export participation implies lower marginal costs) would be stronger for certain sub-groups of exporters.

Thus, if we were to find a larger productivity premium for direct exporters relative to indirect exporters and for exporters to outside Africa compared to exporters within the region, how could it be interpreted? First, this finding could be rationalized by arguing that if there are learning effects, they are likely to be greater for direct exporters and exporters to outside of Africa. The learning-by-exporting hypothesis assumes that purchasers are the ultimate source of the information learnt, which translates into product improvements or lower costs. It could be argued that the quality or quantity of this information is likely to be higher when the exporters are in direct contact with its source. It also appears reasonable that exporters are more likely to learn from clients if the latter are in a more developed economy than their own, where technology and management techniques are more advanced. In the African context, the distinction between exporters to more developed economies and other exporters largely overlaps that between exporters to outside of Africa and those who export only to destinations within the region.

Second, what about selection effects? While we argued that learning by exporting is likely to be greater for direct exporters and exporters to outside Africa, this may not be true for selection effects. Recall that in the Clerides et al. model, the relation of the productivity premium to the self-selection of more efficient producers into exporting arises as productivity has to be high enough to generate positive net operating profits, that is gross profits greater then the per period fixed costs M. The higher are per period fixed costs, the higher will be the level of productivity necessary to enter exporting and the larger the exporter's productivity premium from selection.

Are flow fixed costs likely to be higher for direct exporters or exporters to outside Africa? If these costs are thought of as including dealing with customs, barriers to export

markets, and other bureaucratic requirements, plus flow costs of market research and modifying/maintaining distribution channels, then in the absence of empirical evidence, it is not clear what it sensible to assume regarding the relative sizes of M_D and M_I, and M_{OA} and M_A. That is, we may think that $M_D > M_I$ since direct exporters would have to incur these costs on their own. However, the relation could be the other way around because the domestic intermediaries that facilitate indirect exporting may not be efficient and could charge firms higher charges for these flow fixed cost items. Also, it could be that $M_{OA} > M_A$, as continuing market research and improving distribution is likely to be more costly for exporters to outside Africa. However, again it could be that the costs are greater for those exporting within the region, where customs and bureaucratic requirements are often high.

Thus, considering this mechanism it is hard to say for which sub-group we would expect selection effects to be stronger. Of course, there is another possible channel. Since the pressure of competition is likely to be stronger in export markets than in the domestic market, then only the more efficient firms can meet this competition and become exporters. It does not seem there would be any difference in this mechanism for direct or indirect exporters, to the extent that both are exporting to similar markets. That is, the domestic intermediary would also need to "select" more efficient firms able to handle foreign competition. Comparing exporters to outside Africa and within the region, however, it seems more likely that there would be stronger selection effects for firms exporting to outside Africa, where markets are more competitive.

Given limitations of our data, it is not possible to prove that learning-by-exporting contributes to a finding of a higher productivity premium for direct exporters and exporters to outside Africa. However, the arguments above suggest that it seems reasonable that this finding may be consistent with some learning-by-exporting effects. Of course, the premium is likely to relate to selection effects also, but it is somewhat harder to be certain which sub-groups we would expect to have larger selection effects.

III. Estimation and Data

A. Estimation

In estimating the productivity premium of exporters of various categories, we assume that the technology of each firm is given by the Cobb-Douglas production function:

$$Q_{it} = \alpha_{it} + \beta_K K_{it} + \beta_M M_{it} + \beta_L L_{it} + \varepsilon_{it} \qquad (1)$$

where, Q_{it} is the log of the output of establishment i in year t, K_{it}, M_{it} and L_{it} are the logs of capital goods, intermediate inputs and labor inputs respectively, ε_{it} is a zero mean,

iid random error term uncorrelated with factor inputs, and α_{it} is total factor productivity. We assume also that α_{it} is not correlated with factor inputs and is composed of a firm-specific, time invariant component, α_i, an industry-specific but time invariant component, α_S, and a purely temporal component, α_t, such that:

$$\alpha_{it} = \alpha_i + \alpha_S + \alpha_t \tag{2}$$

Estimation of components of the time invariant firm-specific component α_i is the main objective in the data analysis. We further assume that at least a fraction of α_i is a linear combination of the firm's observable characteristics, including exporting status, so that we can write:

$$\alpha_i = \alpha_{0i} + \sum_{j=1}^{k} \alpha_j X_{jit} \tag{3}$$

where X_{jit} is the value of the j th observable characteristic $(j = 1,...,k)$ for i at time t and α_{0i} is an unobservable random firm effect that cannot be explained in terms of any observable firm characteristics. The results reported in the next section regarding the relative productivity of various categories of exporting firms are based on the GLS estimation of equation (1) subject to (2) and (3). The most important variable among the X_{jit}'s of (3) in this context is a dichotomous variable that is unity for an exporting firm and is zero otherwise. The estimated coefficient of this variable is the estimate of the average productivity premium of exporter.

Following from the Clerides et al. model described above, and Roberts and Tybout (1997), we also estimate a reduced-form export market participation equation in which the X_{jit}'s of (3), other than exporting status itself, figure as right hand side variables.

We estimate the export participation equation by maximum likelihood using a probit model in order to supplement the results of estimating equation (1). As will be reported later, this is a useful exercise because the coefficient estimates of certain variables generally known to influence productivity in other studies turn out to be not significant in equation (1). However, the same variables have large and statistically significant coefficients in the participation equation, suggesting that their statistical insignificance in equation (1) may be due to a multicollinearity problem arising from their inclusion along side exporting status as right hand side variables.

B. Data and Variables

The Ghanaian and Kenyan firm data comes from surveys of manufacturing establishments carried out under the Regional Program on Enterprise Development (RPED) of the World Bank. The data on Ethiopian firms is from a survey of manufacturers carried out with a comparable instrument and a very similar sampling design. All three surveys covered between 200 and 230 firms in two or three waves. The first wave of the Ghanaian survey was carried out in 1992. It covered 200 establishments and was followed by revisits of the same firms in 1993 and 1994.[4] The Kenyan survey took place during 1993 through 1995, beginning with about 223 firms; while the Ethiopian survey collected data on 220 firms covering the years 1993–1995. As can be seen from Table 2 the samples for the Ghanaian and Kenyan surveys were drawn in approximately equal proportions from four industries: food and beverages, textiles and garments, wood work and metal work. Although there were no sector restrictions in sampling for the Ethiopian survey, the same four sectors also accounted for about 48 percent of establishments in the sample.

The 1992–94 Ghanaian survey generated an unbalanced panel of 645 observations on 215 establishments. The Kenyan survey resulted in an unbalanced panel of 656 observations on 223 establishments. The Ethiopian data set consists of an unbalanced panel of 688 observation on 251 establishments. After omitting 700 data points for which observations on one or more of the main variables of interest were missing, the effective sample was much smaller at a panel of 1271 observations on 599 establishments for all the three countries. Of these, 251 establishments are from the Ethiopia, 142 from Ghana and 206 from Kenya. Table 1 lists notation and definition of the variables of interest; Table 2 shows the distribution of the observations by country, industry and year of observation; and Tables 3 and 4 provide descriptive statistics.

The dependent variable in the productivity equation (1) is OUTPUT, defined as the logarithm of the value of annual gross output at 1993 dollars. The corresponding input variables are: INTERMEDIATE, defined as the log of the annual consumption of materials and utilities at 1993 dollars; LABOR, which is the log of annual total labor cost at 1993 dollars; and CAPITAL, defined as the log of the estimated market value of equipment at 1993 dollars. In all cases national, rather than international or sector-specific deflators, along with national official exchange rates were used to arrive at 1993–dollar figures. This is potentially a source of measurement error, but should be minimized by the inclusion of industry, year and country dummies. The cost of this approach is that we are unable to interpret the coefficients of these dummy variables as industry and country effects.

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[4] The original number of establishments was expanded to 215 in later waves when firms that were dropped out were replaced in the sample by similar firms.

Table 1. Definition of Variables

Variable Notation	Definition
Trade Variables:	
EXPORTER	=1 if the establishment is currently exporting
DIRECT_EXPORTER	=1 if the establishment is currently exporting directly
DIRECT_AFRICA	=1 if the establishment is currently directly exporting only within Africa
DIRECT_EXAFRICA	=1 if the establishment is currently directly exporting to outside of Africa
percent_EXPORTED	the value of annual exports as percentage of annual output
percent_IMPORTED	the percentage share of imports in annual purchase of intermediate inputs
Percent_FOREIGN	Percentage share of foreign owners in total equity
IMPORT_COMPETITON	=1 if imports have been a source of competition to the firm
FOREIGN_LICENSE	=1 if the firm holds a foreign license
FTA_CONTRACT	=1 if the firm has a technical assistance contract with a foreign partner
LICENSE_FTA	=1 if the firm holds a foreign license or has a foreign technical assistance contract
FOREIGN	=1 if percent_FOREIGN>0
FOREIGN_LINKS	=1 if percent_FOREIGN>0 or LICENSE_FTA>0
Production Variables:	
OUTPUT	The log of constant dollar value of annual output
INTERMEDIATE	The log of constant dollar value of annual consumption of intermediate inputs
LABOR	The log of constant dollar annual labor cost
CAPITAL	The log of constant dollar estimated market value of plant and equipment
Other Firm Characteristics:	
EMPLOYMENT	Number of employees at the end of the year
AGE	Number of years since the establishment started to operate
FOOD & BEVERAGES	=1 if in the Food and beverages industry
TEXTILES	=1 if in the Textiles and garment industry
WOOD WORK	=1 if manufacturing of wood products
METAL WORK	= if manufacturing of fabricated metal products

Table 2. Means of Dummy Variables for Exporting Status, Industry, and Year of Observation, by Country

Variable	Country			
	Ethiopia	Ghana	Kenya	All
EXPORTER	0.0369	0.1033	0.2516	0.1270
Industries:				
Food and beverage	0.1406	0.2571	0.2123	0.1888
Textiles	0.0598	0.1673	0.2363	0.1440
Woodwork	0.1283	0.2204	0.2976	0.2069
Metalwork	0.1248	0.2612	0.2538	0.1975
Years of Observation:				
1991				
1992		0.4816		0.0928
1993	0.2882	0.5184	0.3632	0.3596
1994	0.3585		0.3348	0.2809
1995	0.3533		0.3020	0.2667
Number of observations	569	245	457	1271
Number of firms	251	142	206	599

Table 3. Means of Dummy Variables for Foreign-Trade-Related Variables

Variable	Country			
	Ethiopia	Ghana	Kenya	All
All firms:				
DIRECT_EXPORTER	0.0141	0.0625	0.1904	0.0869
DIRECT_AFRICA	0.0035	0.0408	0.1554	0.0653
DIRECT_EXAFRICA	0.0105	0.0204	0.0350	0.0212
IMPORT_COMPETITON	0.3304	0.2449	0.2232	0.2754
FOREIGN_LICENSE	0.0598	0.0296	0.0350	0.0460
FTA_CONTRACT	0.0158	0.0542	0.0460	0.0327
LICENSE_FTA	0.0808	0.0898	0.1094	0.0928
FOREIGN	0.0334	0.1714	0.1510	0.1023
FOREIGN_LINKS	0.0879	0.3592	0.1510	0.1629
Exporters :				
DIRECT_EXPORTER	0.3810	0.6522	0.7217	0.6667
DIRECT_AFRICA	0.0952	0.4000	0.5826	0.4907
DIRECT_EXAFRICA	0.2857	0.2000	0.1391	0.1677
IMPORT_COMPETITON	0.3810	0.2800	0.2348	0.2609
FOREIGN_LICENSE	0.0000	0.0000	0.1130	0.0850
FTA_CONTRACT	0.0000	0.1111	0.1391	0.1169
LICENSE_FTA	0.0000	0.2000	0.3217	0.2609
FOREIGN	0.0000	0.2000	0.3826	0.3043
FOREIGN_LINKS	0.0000	0.5200	0.3652	0.3416
Foreign owned:				
EXPORTER	0.0000	0.1111	0.5000	0.2469
DIRECT_EXPORTER	0.0000	0.0465	0.3667	0.1646
DIRECT_AFRICA	0.0000	0.0435	0.3000	0.1341
DIRECT_EXAFRICA	0.0000	0.0000	0.0667	0.0244
IMPORT_COMPETITON	1.0000	0.4565	0.1333	0.3780
FOREIGN_LICENSE	0.0000	0.0294	0.1000	0.0571
FTA_CONTRACT	0.0000	0.1714	0.1000	0.1268
LICENSE_FTA	0.0000	0.1957	0.3667	0.2439
Foreign owned exporters:				
DIRECT_EXPORTER		0.6667	0.7333	0.7222
DIRECT_AFRICA		0.4000	0.6000	0.5500
DIRECT_EXAFRICA		0.0000	0.1333	0.1000
IMPORT_COMPETITON		0.4000	0.0667	0.1500
FOREIGN_LICENSE		0.0000	0.2000	0.1579
FTA_CONTRACT		0.2000	0.1333	0.1500
LICENSE_FTA		0.2000	0.6667	0.5500

Table 4. Descriptive Statistics of Continuous Variables

	Country							
	Ethiopia		Ghana		Kenya		All	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All firms:								
Percent_EXPORTED	1.22	9.84	3.47	16.10	11.79	28.93	5.46	20.44
Percent_IMPORTED	45.85	39.52	26.29	36.98	20.28	31.52	32.89	38.19
Percent_FOREIGN	1.85	12.35	9.11	21.21	9.86	26.38	6.13	20.48
EMPLOYMENT	117.70	427.00	49.26	76.31	78.90	200.65	90.56	312.78
AGE	17.54	13.29	15.20	11.83	17.73	13.36	17.16	13.07
OUTPUT	10.86	2.06	28.48	1.86	11.45	2.43	14.47	7.19
INTERMEDIATE	10.12	2.31	27.97	1.95	10.74	2.61	13.78	7.33
LABOR	8.79	2.07	26.29	2.03	9.22	2.21	12.32	7.15
CAPITAL	9.97	2.44	26.87	2.89	10.54	2.84	13.43	7.10
Exporters only:								
Percent_EXPORTED	32.93	40.65	39.34	39.90	45.07	40.99	42.68	40.77
Percent_IMPORTED	36.97	33.10	25.64	34.76	40.54	37.06	37.76	36.40
Percent_FOREIGN	0.00	0.00	11.00	22.57	24.99	36.69	19.56	33.44
EMPLOYMENT	451.76	327.67	89.00	97.83	205.00	350.96	219.17	335.43
AGE	26.00	17.45	14.80	8.55	18.48	12.45	18.89	12.99
Foreign owned:								
Percent_EXPORTED	0.00	0.00	1.14	4.29	18.47	33.64	7.55	22.32
Percent_IMPORTED	96.33	4.93	45.34	40.99	30.77	34.95	43.74	40.51
Percent_FOREIGN	100.00	0.00	48.50	22.04	90.00	30.51	67.45	32.77
EMPLOYMENT	75.17	28.23	112.17	138.62	105.33	103.32	106.96	120.99
AGE	33.50	6.02	19.33	13.15	28.70	13.54	23.79	13.82
Foreign owned exporter:								
Percent_EXPORTED			12.50	8.66	36.93	40.17	31.79	37.04
Percent_IMPORTED			44.00	43.36	43.87	31.09	43.90	33.28
Percent_FOREIGN			55.00	5.52	100.00	0.00	88.75	20.15
EMPLOYMENT			189.00	155.25	174.80	103.51	178.35	114.06
AGE			16.00	7.84	27.13	15.10	24.35	14.33

The key right-hand side variable of the productivity equation is $EXPORTER_{it}$, which is equal to unity if establishment *i* is an exporter in year *t* and zero otherwise. The same variable is used as the dependent variable in our estimation of the export market participation equation. In alternative specifications of the productivity equation, we replace $EXPORTER_{it}$ jointly by $DIRECT\_EXPORTER_{it}$ and $INDIRECT\_EXPORTER_{it}$ or jointly by $DIRECT\_AFRICA_{it}$ and $DIRECT\_EXAFRICA_{it}$. The variable $DIRECT\_EXPORTER_{it}$ is unity if firm *i* is a direct exporter in year *t* and zero otherwise, where direct exporting means finding customers and shipping directly to them without the use of a domestic intermediary. The variables $DIRECT\_AFRICA_{it}$ and $DIRECT\_EXAFRICA_{it}$ similarly distinguish between direct exporters confined to Africa and those who export to destinations outside of Africa as well.

About 13 percent of the establishments in all three countries export part of their output (Table 2). This, however, is an average of extremes: only 4 percent of manufacturers in the Ethiopian sample are exporters against 25 percent of those in the Kenyan sample and 10 percent of those in the Ghanaian sample. There is similar variation between the three samples in terms of the proportion of output exported as well. The average percentage of annual output that is exported is about 5 percent for the sample pooled across the three countries against about 1 percent for the Ethiopian sample, 3 percent for the Ghanaian sample and 12 percent for the Kenyan sample. Although the figures for all the three countries suggest manufacturing sectors of very low degrees of export orientation, the proportion of exports to total output is invariably large for establishments that do export ranging from 34 percent for Ghana to 45 percent for Kenya.

About a third of exporters in the pooled sample export through domestic intermediaries. Again there is substantial cross-country variation here, with the proportion of direct exporters ranging from 38 percent for Ethiopian sample to 72 percent for the Kenyan sample. Most direct exports are to destinations within Africa; those who directly export to outside of Africa are 25 percent of all direct exporters in the overall sample. Surprisingly, the latter proportion is lowest for Kenya (18 percent), the country with the highest proportion of exporting firms, and highest for Ethiopia (75 percent).[5] About one third of direct exporters in the Ghanaian sample export to destinations outside of Africa.

Exporting firms are strikingly different from non-exporters with respect to variables that the empirical literature has found to be important covariates of productivity. In particular, the average exporter is more than twice as large as the average non-exporter, measuring size by the number of regular employees. Although the difference between size in terms of age is not as large, the average exporter has also typically been in the current business for a significantly longer period. More importantly from our point of view, the two groups of firms sharply contrast in terms of "trade related" variables, as identified in Table 1. First, the incidence of foreign held equity for exporters (20 percent) is more than

[5] For Ethiopia, it should be kept in mind that these country-specific figures are less informative since they are based on such a small share of exporters in the sample.

four times that of non-exporters in the pooled sample. Secondly, exporters are almost three times more likely to have foreign links in the form of operating on foreign license or entering into a technical assistance arrangement with a foreign partner (Table 3). Indeed, 37 percent of exporters are linked to foreign agents through foreign ownership, licensing or technical assistance compared to less than 15 percent of non-exporters who have similar links. Third, the consumption of intermediate inputs is significantly more import intensive for exporters (Table 4). The only dimension of external links where there does not seem to be significant difference between the two groups is competition from imports, with approximately a quarter of firms in each group identifying imports as a major source of competition for their products.

A variation on the theme of endogenous growth is that knowledge embodied in capital and intermediate goods imported from more advanced economies is a source of productivity growth in a developing economy (Grossman and Helpman, 1991; Coe, Helpman and Hoffmeister, 1995). This idea implies that domestic firms with higher import intensive capital stocks or intermediate inputs should be more productive in economies where the capital goods industry is underdeveloped or the rate of investment on R & D is relatively low. If this were the case in our data, we could find exporters more productive than non-exporters, but it would stem from higher import intensity, not selection or learning effects. In order to control for this, the variable percent_IMPORTS, that is, the percentage of imports in annual intermediate inputs, is included as a control variable. It is also possible that exporters are more productive simply because of they have been more successful in imitating product designs of imports or have survived stronger import competition.[6] The true productivity premium that can be attributed to exporting status should be net of such influence of imports as a source of competitive pressure or of opportunity for imitation. Whether or not an establishment considers imports as a major source of competition, that is, the variable IMPORT_COMPETION, is therefore the second control in the productivity equation.

The third control variable is percent_FOREIGN, the percentage share of foreign ownership. Foreign direct investment has long been considered a major source of productivity growth for developing economies, because it is believed to be a vehicle for the international transfer of management skills, technical know-how and market information that cannot be licensed out or transferred to clients though arms-length technical assistance arrangements.[7] If this is true, the average total productivity of exporters could be higher than that of non-exporters because the higher incidence of

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[6] MacDonald (1994) found that growth in competition from imports led to large increases in labor productivity in highly concentrated industries in the US in the 1970s and the 1980s, although it did not have any observable impact on productivity in less concentrated industries.

[7] See, for example, Teece, 1977; Mansfield and Romeo, 1980; and Helleiner, 1989.

foreign ownership among exporters.[8] Some 20 percent of exporters in our Ghanaian sample and 38 percent in the Kenyan sample have foreign equity participation, compared to just 10 percent for all firms. Conversely an equal proportion of foreign-owned establishments export their products, the proportion being as high as 50 percent for the Kenyan sample.

Foreign equity participation also happens to be highly correlated with the import intensity of inputs and the occurrence of other mechanisms of direct transfer of technology, the correlation being stronger for exporters among foreign owned establishments. The other mechanisms of direct transfer of technology for which there are data are foreign licensing and technical assistance contracts with foreign partners. Over the full sample, intermediate inputs are 1.5 times as import-intensive for foreign owned firm (Table 4). A foreign owned firm is also twice as likely to hold a foreign technical assistance contract, and three times more likely to either hold a foreign license or obtain technical assistance from a foreign partner (Table 3). The contrast between foreign owned firms and others is not as sharp in the same respects when we confine ourselves to exporters only. However, there is a significant difference between foreign owned exporters and non-foreign owned exporters as well. Intermediate inputs of foreign owned firms are significantly higher among exporters as is the probability of holding a foreign license or foreign technical assistance contract. Because foreign licenses or technical assistance contract with foreign partners are expected to lead to a productivity gain on their own, the variable LICENSE_FTA is the fourth control variable.

The firm's age, measured as the log of the number of years it has been in business, and its size, measured as the log of the number of its regular employees, are two additional controls in the productivity equation. Either because of dynamic economies of scale or as the outcome of market selection, or both, total factor productivity is invariably found to increase with firm size in empirical work. In contrast, the sign of the effect of age on productivity is theoretically ambiguous and empirically mixed (although usually statistically significant) in the literature. Including an establishment's size and age among the controls ensures that the estimated productivity premium of exporters is net of the productivity implications of the average exporter being larger or longer established in business than the average non-exporter.

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[8] The greater focus in the empirical literature is on the spillover effects of FDI on productivity. However, the evidence is probably stronger for its direct effect on firm level productivity. See, for example, Aitken and Harrison (1999) on Venezuela, Griffith (1999) on the UK and Grether (1999) on Mexico.

IV. RESULTS

A. Are Exporters More Productive than Non-Exporters?

Table 5 reports the results of the GLS estimation of equation (1), using the variable $EXPORTER_{it}$ as the indicator of exporting status. Estimates reported in the first column of the table are based on the data pooled across all the three countries. Column two contains estimates excluding observations on Ethiopia, the country with an extremely low proportion of exporters. Results based on the Kenyan and Ghanaian samples are reported separately in the third and fourth columns respectively. Column one gives an idea of the average relationship between exporting status and productivity for the region as a whole; while column two reflects the average relationship for countries of the region where exports account for a substantial proportion of manufacturing output. The contrast between the third and fourth columns should give us some idea of the cross-country variation in the productivity premium of exporters among countries that are substantial exporters.

As we can see from the first column, the total factor productivity of the average exporter for all the three countries is 15.7 percent higher than that of the average non-exporter. The exporter's premium rises to 17.1 percent when Ethiopian firms are excluded from the sample. This figure is an average of the much larger premium for Kenyan exporters (28.4 percent) and the lower figure for exporters in Ghana (10.6 percent). Because a wider range of possible influences on productivity are controlled for, these estimates are not strictly comparable to those of previous studies. To facilitate comparison, Table 6 shows how the estimated premium varies as groups of controls are dropped. It is clear from this table that, regardless of the set of controls, the estimates are surprisingly close to those reported for the U.S. and some East Asian economies. For U.S. manufacturing industries, Bernard and Jensen (1999) report figures ranging between 13 percent and 16 percent; Kraay's (1998) estimate for his sample of Chine's firms is in the range of 23–29 percent; Aw, Chung and Roberts (1999) estimate a premium of 15–20 percent for the sample of Taiwanese firms and a premium of 5–23 percent for exporters in Korean industries; and Sjoholm (1999) reports a 31 percent premium for exporters in Indonesia.

The most influential control variable in Table 5 is firm size. For example, a doubling of an establishment's employment size is associated with about a 23 percent increase in its productivity, considering Kenyan and Ghanaian firms together and with a 40 percent increase for Kenyan firms only (Table 5). As a result, the omission of firm size in estimating the productivity equation would raise the premium of exporters from 15.7 percent to 24 percent for the full sample. Firm age also has a significant influence on productivity in the pooled sample but not for the combined Kenyan and Ghanaian data.

Table 5. Estimated Productivity Equation

(Dependent Variable=OUTPUT)

	All three countries	Ghana and Kenya	Kenya	Ghana
INTERMEDIATE	0.541	0.579	0.516	0.659
	(0.016)**	(0.025)**	(0.037)**	(0.025)**
LABOR	0.201	0.114	0.075	0.245
	(0.021)**	(0.032)**	(0.045)	(0.028)**
CAPITAL	0.050	0.029	0.047	-0.015
	(0.012)**	(0.017)	(0.027)	(0.013)
EXPORTER	0.157	0.171	0.284	0.106
	(0.068)*	(0.083)*	(0.120)*	(0.084)
percent_IMPORTED	0.001	0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
LICENSE_FTA	0.140	0.164	0.172	0.039
	(0.072)	(0.102)	(0.148)	(0.107)
percent_FOREIGN	0.000	0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)
IMPORT_COMPETITION	-0.048	-0.001	0.062	0.014
	(0.048)	(0.070)	(0.102)	(0.080)
Log (EMPLOYMENT)	0.112	0.228	0.391	-0.225
	(0.052)*	(0.081)**	(0.108)**	(0.116)
[Log (EMPLOYMENT)]^2	0.010	0.008	-0.003	0.043
	(0.006)	(0.010)	(0.013)	(0.017)*
Log (AGE)	-0.180	-0.032	-0.050	0.022
	(0.094)	(0.123)	(0.202)	(0.107)
[Log (AGE)]^2	0.033	0.008	0.013	-0.009
	(0.021)	(0.027)	(0.042)	(0.026)
Textiles	-0.224	-0.316	-0.373	-0.274
	(0.065)**	(0.089)**	(0.131)**	(0.099)**
Woodwork	-0.218	-0.353	-0.364	-0.333
	(0.058)**	(0.083)**	(0.124)**	(0.095)**
Metalwork	-0.133	-0.204	-0.346	-0.030
	(0.059)*	(0.082)*	(0.130)**	(0.083)
Ethiopia	-0.155			
	(0.056)**			
Ghana	3.408	4.513		
	(0.356)**	(0.512)**		
1992	-0.039	-0.088		-0.029
	(0.077)	(0.089)		(0.037)
1994	-0.063	-0.230	-0.210	
	(0.045)	(0.078)**	(0.092)*	
1995	-0.096	-0.200	-0.139	
	(0.046)*	(0.081)*	(0.095)	
Constant	3.159	3.402	3.879	4.401
	(0.171)**	(0.236)**	(0.338)**	(0.715)**
R-sq	0.9925	0.9935	0.8981	0.9638
Chi-sq for Breush-Pagan test	9.49	0.11	0.01	18.19
Wald Chi-sq	139008.53	93847.69	3321.35	4121.86
Number of Observations	1268	699	457	242
Number of firms	599	348	206	142

Standard errors in parentheses

* significant at 5 percent level; ** significant at 1 percent level

Table 6. Sensitivity of Productivity Premium of Exporters to Variable Omission

Omitted Variables	All three countries	Ghana and Kenya	Kenya	Ghana
None	0.157	0.171	0.284	0.106
	(0.068)*	(0.083)*	(0.120)*	(0.084)
Industry dummies	0.161	0.169	0.274	0.098
	(0.068)	(0.084)	(0.121)	(0.086)
Year dummies	0.152	0.167	0.272	0.111
	(0.068)	(0.084)	(0.121)	(0.084)
Age	0.160	0.169	0.278	0.109
	(0.067)*	(0.082)*	(0.118)*	(0.084)
Size	0.237	0.293	0.439	0.124
	(0.068)**	(0.085)**	(0.124)**	-0.085
Percent_IMPORTED and IMPORT_COMPETITION	0.160	0.172	0.289	0.108
	(0.068)	(0.083)	(0.119)	(0.084)
LICENSE_FTA and percent_FOREIGN	0.168	0.191	0.299	0.107
	(0.067)	(0.081)	(0.115)	(0.084)
LICENSE_FTA	0.169	0.190	0.305	0.107
	(0.068)*	(0.082)*	(0.119)*	(0.084)
Percent_FOREIGN	0.155	0.170	0.275	0.106
	(0.067)*	(0.082)*	(0.117)*	(0.084)
Percent_IMPORTED, IMPORT_COMPETITION, LICENSE_FTA and percent_FOREIGN	0.172	0.192	0.305	0.110
	(0.067)	(0.081)	(0.114)	(0.084)

Standard errors in parentheses
*Significant at the 5 percent level; ** Significant at the 1 percent level.

B. The Productivity Premium of Exporters and Other Forms of External Links

In estimating the productivity premium, we argued that it was important to control for the import-intensity of inputs, competition from imports, foreign direct investment, foreign licensing and technical assistance from foreign partners. Surprisingly, and contrary to findings of other studies, none of these external link variables were found to be statistically significant. However, there at least three reasons to think that this is the result of the same variables being strongly collinear with exporting status rather than evidence that the variables do not influence productivity. The first (and weakest) piece of evidence is that omitting the same variables from the specification used in Table 5 raises the productivity premium of exporters (Table 6) slightly.[9] Secondly, many of the same variables are significant in the export market participation equation reported in Table 7. The idea is not to imply that causation flows from the variables to exporting status, but rather that there is a high degree of correlation between the two groups of variables. Next to country of residence and sector of activity, foreign equity participation, the holding of foreign licenses and access to foreign technical assistance are the most important features distinguishing exporters from non-exporters in all three countries, as can be seen from the first column of the table. In the sample without Ethiopian firms (column two) exporters also experience stronger competition from imports. In addition, the amount by which the import-intensity of exporters exceeds that of non-exporters becomes statistically significant in the Kenyan sub-sample.

The third indication that the productivity effect of foreign links is concealed by their collinearity with exporting status is given in Table 8, which presents estimates of equation (1), using a sample that excludes exporters with foreign ownership or those holding a foreign license or technical assistance contract.[10] A large part of the fall in the exporting premium for the full sample (from a statistically significant 15.7 percent in Table 5 to a statistically insignificant 7.3 percent in Table 8) can be attributed to the correlation between foreign links and productivity. The 95 percent confidence interval for the exporting productivity premium falls from 2.5 percent to 29 percent to -8.8 percent to 23.3 percent. There are similar contrasts between the other corresponding columns of Tables 5 and 8.[11]

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[9] The premium increases from 15.7 percent to 17.2 percent for the full sample, from 17.1 percent to 19.2 percent for the Kenyan and Ghanaian sample, and from 28.4 percent to 30.5 percent for the Kenyan sample only

[10] This reduces the proportion of exporters in the sample and thus the precision of the estimates.

[11] Omitting all firms with foreign ownership or those who hold foreign licenses or technical assistance contracts rather than only exporters with the same characteristics leads to more or less the same results.

Table 7. Estimated Export Market Participation Equation

(Dependent variable = EXPORTER)

	All three countries	Ghana and Kenya	Kenya	Ghana	Ghana
percent_IMPORTED	0.002	0.013	0.008	0.020	0.015
	(0.005)	(0.008)	(0.007)	(0.020)	(0.016)
LICENSE_FTA	1.164	1.644	2.317	7.097	-1.476
	(0.570)*	(0.705)*	(0.779)**	(3.149)*	(2.015)
percent_FOREIGN	0.035	0.065	0.027	0.024	-0.273
	(0.007)**	(0.014)**	(0.007)**	(0.037)	(0.028)
IMPORT_COMPETITION	0.472	2.365	-0.592	2.326	0.876
	(0.453)	(0.772)**	(0.704)	(1.573)	(1.093)
Log (EMPLOYMENT)	2.573	2.398	2.765	6.526	1.850
	(0.639)**	(1.037)*	(0.948)**	(3.764)	--
[Log (EMPLOYMENT)]^2	-0.078	0.013	0.006	-0.450	0.073
	(0.067)	(0.148)	(0.121)	(0.408)	(0.100)
Log (AGE)	1.597	4.264	1.469	-2.869	-2.374
	(1.083)	(1.458)**	(2.130)	(2.377)	(2.803)
[Log (AGE)]^2	-0.527	-1.284	-0.563	0.212	0.376
	(0.251)*	(0.381)**	(0.451)	(0.535)	(0.543)
Textiles	-1.516	-1.028	-1.311	3.432	
	(0.619)*	(0.733)	(0.910)	(2.004)	
Woodwork	-1.288	-0.015	-0.133	0.925	
	(0.682)	(0.716)	(0.880)	(2.155)	
Metalwork	0.338	0.062	1.439	-9.740	
	(0.596)	(0.710)	(0.924)	(4.329)*	
Ethiopia	-5.727				
	(1.022)**				
Ghana	-2.275	-2.476			
	(0.726)**	(0.791)**			
1992	-1.188	-0.739		-1.036	
	(0.655)	(0.639)		(0.758)	
1994	0.120	0.087	-0.290		
	(0.375)	(0.482)	(0.483)		
1995	0.478	0.349	0.009		
	(0.366)	(0.492)	(0.473)		
Constant	-11.606	-17.355	-13.896	-24.361	-12.974
	(2.242)**	(3.694)**	(3.391)**	(11.079)*	
Log likelihood	-224.01	-173.73	-106.38	-55.07	-59.17
Wald Chi-sq (df)	54.17 (16)	33.85 (15)	35.29 (13)	7.21 (12)	--
Rho	0.9512	0.9777	0.9595	0.9891	0.9794
Chi-sq(1) for LR-test of rho=0	163.91	118.53	82.32	27.17	28.76
Number of observations	1268	699	457	242	242
Number of firms	599	348	206	142	142

Standard errors in parentheses
*Significant at 5 percent level; ** significant at 1 percent level

Table 8. Productivity Premium of Exporters with No Foreign Ownership or Foreign Technical Assistance

(Dependent variable = OUTPUT)

	All thee countries	Ghana and Kenya	Kenya	Ghana
INTERMEDIATE	0.548	0.601	0.546	0.661
	(0.016)**	(0.026)**	(0.040)**	(0.026)**
LABOR	0.199	0.107	0.059	0.246
	(0.022)**	(0.032)**	(0.048)	(0.029)**
CAPITAL	0.047	0.022	0.031	-0.014
	(0.012)**	(0.018)	(0.029)	(0.014)
EXPORTER	0.073	0.074	0.103	0.046
	(0.082)	(0.102)	(0.143)	(0.136)
percent_IMPORTED	0.000	0.000	0.000	-0.001
	(0.001)	(0.001)	(0.002)	(0.001)
LICENSE_FTA	0.083	0.042	-0.073	0.028
	(0.084)	(0.138)	(0.245)	(0.117)
Percent_FOREIGN	-0.001	-0.001	-0.002	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)
IMPORT_COMPETITION	-0.017	0.061	0.144	0.032
	(0.048)	(0.071)	(0.105)	(0.084)
Log (EMPLOYMENT)	0.102	0.183	0.363	-0.211
	(0.053)	(0.083)*	(0.112)**	(0.120)
[Log (EMPLOYMENT)]^2	0.012	0.016	0.007	0.039
	(0.006)	(0.011)	(0.015)	(0.018)*
Log (AGE)	-0.195	-0.056	-0.048	-0.001
	(0.094)*	(0.121)	(0.195)	(0.114)
[Log (AGE)]^2	0.035	0.012	0.011	-0.004
	(0.021)	(0.027)	(0.041)	(0.027)
Textiles	-0.191	-0.276	-0.300	-0.278
	(0.065)**	(0.088)**	(0.132)*	(0.103)**
Woodwork	-0.207	-0.341	-0.324	-0.347
	(0.059)**	(0.084)**	(0.128)*	(0.101)**
Metalwork	-0.107	-0.171	-0.260	-0.042
	(0.060)	(0.084)*	(0.136)	(0.087)
Ethiopia	-0.126			
	(0.055)*			
Ghana	3.398	4.370		
	(0.358)**	(0.518)**		
1992	-0.046	-0.094		-0.019
	(0.079)	(0.093)		(0.039)
1994	-0.051	-0.236	-0.228	
	(0.047)	(0.086)**	(0.102)*	
1995	-0.096	-0.242	-0.189	
	(0.048)*	(0.088)**	(0.104)	
Constant	3.123	3.360	3.835	4.297
	(0.171)**	(0.237)**	(0.338)**	(0.750)**
R-sq	0.9927	0.9940	0.8882	0.9599
Wald Chi-sq	138134.31	97496.14	2893.66	3592.64
Chi-sq for Breusch-Pagan Test	4.92	0.64	1.24	17.58
Observations	1193	624	395	229
Number of firms	569	318	181	137

Standard errors in parentheses

* significant at 5 percent level; ** significant at 1 percent level.

C. Productivity Premiums of Direct Exporters and Exporters to Outside of Africa

Next we compare the productivity of particular sub-groups of exporters, namely, direct versus indirect exporters, and exporters to destinations outside of Africa compared to exporters to within the region. The learning-by-exporting hypothesis would predict higher productivity for direct exporters, since they are in direct contact with purchasers, and for exporters to outside of Africa, because clients in more industrially developed economies are likely to have more technical and managerial information to share. Of course, part of each subgroup's premium is also due to selection effects. We argued above, however, that it is somewhat more difficult to be certain that selection effects would necessarily be stronger for direct exporters and exporters to outside Africa. It should also be noted that because the premium is net of the effect of size on productivity, no part of any possible gains from learning can be attributed to the economies of scale that exporters may realize. Table 9 re-estimates the productivity equation of Table 5 by replacing the variable $EXPORTER_{it}$ jointly by the variables $DIRECT\_EXPORTER_{it}$ and $INDIRECT\_EXPORTER_{it;}$ and Table 10 uses $DIRECT\_AFRICA_{it}$ and $DIRECT\_EXAFRICA_{it}$ as the export status variables.

The first column of Table 9 indicates that the 15.7 percent premium estimated for exporters as a whole is composed of a much higher figure for direct exporters (24 percent) and a smaller figure for indirect exporters (5 percent and not statistically significant). Direct exporters' premium falls to 21 percent excluding Ethiopian firms from the sample while the premium of indirect exporters rises to 14 percent but, nonetheless, remains statistically insignificant (similarly for the Kenyan and Ghanaian samples). The premiums of direct exporters for the Kenyan sample (33 percent) and Ghanaian sample (13 percent) are higher than for exporters overall (28 percent) and (11 percent) in the respective samples.

Table 10 shows how the premium of direct exporters breaks down into components corresponding to those directly exporting to destinations outside of Africa and those directly exporting within Africa. In the pooled sample, the productivity premium of direct exporters to outside of Africa is 35.2 percent. This should be compared with a premium of 20 percent for direct exporters within Africa, 15.7 percent for exporters as a whole and a statistically insignificant 5.1 percent for indirect exporters to destinations within Africa. In the Kenyan sample alone, the premium for direct exporters to outside of Africa is quite large, (58 percent), while the figure for the Ghanaian sample is much smaller (16 percent) but still higher than the 12 percent premium of direct exporters to within Africa only. Thus, while it is not possible to formally test for learning-by-exporting, we interpret the findings in Tables 9 and 10 as being consistent with the learning-by-exporting hypothesis.

Table 9. Productivity of Direct Exporters

(Dependent variable=OUTPUT)

	All three countries	Ghana and Kenya	Kenya	Ghana
INTERMEDIATE	0.541	0.577	0.513	0.660
	(0.016)**	(0.025)**	(0.037)**	(0.025)**
LABOR	0.202	0.114	0.076	0.245
	(0.021)**	(0.032)**	(0.045)	(0.028)**
CAPITAL	0.049	0.030	0.048	-0.015
	(0.012)**	(0.017)	(0.027)	(0.013)
DIRECT_EXPORTER	0.238	0.207	0.329	0.131
	(0.078)**	(0.093)*	(0.130)*	(0.102)
INDIRECT_EXPORTER	0.051	0.137	0.252	0.026
	(0.096)	(0.123)	(0.164)	(0.138)
percent_IMPORTED	0.001	0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
LICENSE_FTA	0.134	0.162	0.168	0.046
	(0.072)	(0.103)	(0.148)	(0.108)
Percent_FOREIGN	0.000	0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)
IMPORT_COMPETITION	-0.050	-0.006	0.051	0.014
	(0.048)	(0.070)	(0.102)	(0.080)
Log (EMPLOYMENT)	0.111	0.228	0.392	-0.228
	(0.052)*	(0.081)**	(0.108)**	(0.117)
[Log (EMPLOYMENT)]^2	0.010	0.008	-0.004	0.043
	(0.006)	(0.010)	(0.013)	(0.017)*
Log (AGE)	-0.182	-0.032	-0.050	0.012
	(0.094)	(0.123)	(0.202)	(0.108)
[Log (AGE)]^2	0.034	0.008	0.014	-0.007
	(0.021)	(0.027)	(0.042)	(0.026)
Textiles	-0.220	-0.313	-0.367	-0.270
	(0.065)**	(0.089)**	(0.132)**	(0.100)**
Woodwork	-0.215	-0.349	-0.359	-0.341
	(0.058)**	(0.084)**	(0.124)**	(0.098)**
Metalwork	-0.132	-0.204	-0.347	-0.030
	(0.059)*	(0.083)*	(0.130)**	(0.084)
Ethiopia	-0.143			
	(0.056)*			
Ghana	3.426	4.534		
	(0.356)**	(0.514)**		
1992	-0.040	-0.086		-0.031
	(0.077)	(0.089)		(0.037)
1994	-0.060	-0.226	-0.206	
	(0.045)	(0.078)**	(0.093)*	
1995	-0.099	-0.203	-0.146	
	(0.046)*	(0.081)*	(0.095)	
Constant	3.158	3.405	3.883	4.403
	(0.171)**	(0.238)**	(0.338)**	(0.722)**
R-sq	0.9925	0.9935	0.8984	0.9637
Wald Chi-sq	138110.24	92529.66	3327.28	4030.49
Chi-sq for Breusch-Pagan test	8.74	0.10	0.01	17.67
Number of observations	1266	697	457	240
Number of firms	597	346	206	140

Standard errors in parentheses

* significant at 5 percent level; ** significant at 1 percent level.

Table 10. Productivity and Exporting to Outside of Africa

(Dependent variable = OUTPUT)

	All three countries	Ghana and Kenya	Kenya	Ghana
INTERMEDIATE	0.541	0.579	0.516	0.661
	(0.016)**	(0.025)**	(0.037)**	(0.025)**
LABOR	0.201	0.113	0.071	0.245
	(0.021)**	(0.032)**	(0.045)	(0.028)**
CAPITAL	0.049	0.030	0.048	-0.015
	(0.012)**	(0.017)	(0.027)	(0.013)
DIRECT_EXAFRICA	0.352	0.390	0.583	0.157
	(0.131)**	(0.164)*	(0.224)**	(0.154)
DIRECT_AFRICA	0.198	0.152	0.263	0.122
	(0.086)*	(0.100)	(0.139)	(0.105)
INDIRECT_EXPORTER	0.051	0.134	0.249	0.024
	(0.096)	(0.122)	(0.164)	(0.137)
percent_FOREIGN	0.000	0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)
LICENSE_FTA	0.139	0.168	0.179	0.044
	(0.072)	(0.102)	(0.148)	(0.107)
Percent_IMPORTED	0.001	0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
IMPORT_COMPETITION	-0.047	0.000	0.062	0.010
	(0.048)	(0.070)	(0.103)	(0.080)
Log (AGE)	-0.178	-0.026	-0.048	0.020
	(0.094)	(0.123)	(0.202)	(0.108)
$[\text{Log (AGE)}]^2$	0.033	0.007	0.013	-0.008
	(0.021)	(0.027)	(0.042)	(0.026)
Log (EMPLOYMENT)	0.113	0.227	0.398	-0.227
	(0.052)*	(0.081)**	(0.108)**	(0.116)
$[\text{Log (EMPLOYMENT)}]^2$	0.010	0.008	-0.004	0.043
	(0.006)	(0.010)	(0.013)	(0.017)*
Textiles	-0.220	-0.306	-0.355	-0.263
	(0.065)**	(0.089)**	(0.132)**	(0.099)**
Woodwork	-0.213	-0.339	-0.341	-0.325
	(0.058)**	(0.083)**	(0.125)**	(0.095)**
Metalwork	-0.126	-0.189	-0.318	-0.029
	(0.059)*	(0.083)*	(0.132)*	(0.083)
Ethiopia	-0.144			
	(0.056)**			
Ghana	3.426	4.504		
	(0.355)**	(0.512)**		
1992	-0.037	-0.079		-0.028
	(0.077)	(0.089)		(0.038)
1994	-0.065	-0.237	-0.220	
	(0.046)	(0.079)**	(0.093)*	
1995	-0.105	-0.221	-0.168	
	(0.046)*	(0.082)**	(0.096)	
Constant	3.158	3.388	3.873	4.337
	(0.171)**	(0.237)**	(0.338)**	(0.724)**
R-sq	0.9925	0.9935	0.8988	0.9639
Chi-sq for the Breuch-Pagan test	9.10	0.15	0.00	17.31
Number of observations	1268	699	457	242
Number of firms	599	348	206	142

Standard errors in parentheses

* significant at 5 percent level; ** significant at 1 percent level.

V. CONCLUSION

Many firm-level studies in developed and developing economies alike have reported a positive productivity premium of exporters. The premium is a useful economic indicator since it provides an upper bound to a possible contribution of exporting activities to productivity growth or to the international competitiveness gap faced by non-exporters (at current world prices and trade/exchange policy regimes). This paper analyzed data on a sample of manufacturing firms drawn from three Sub-Saharan African countries with two objectives in mind. First, to measure the productivity premium of exporters as accurately as possible, that is, while controlling for the productivity effects of other possible channels for international diffusion of technology. Second, to compare the estimated productivity premium of certain sub-groups of exporters: direct versus indirect exporters and exporters to outside of Africa relative to those exporting within the region.

The sample is drawn from firms in Ethiopia, Ghana and Kenya, which, between them, seem to capture the diversity of the region in terms of the development and export orientation of manufacturing industries. We find that the productivity premium of exporters ranges from about 11 percent for Ghana to about 28 percent for Kenya. The average premium for the three countries is about 16 percent. We also find that, among exporters, direct exporters are over four times more productive than indirect exporters. Moreover, those exporting to destinations outside of Africa are significantly more productive than those exporting within the region.

Given the short time series of the data, it is impossible to test to what extent these premiums are caused by selection of more efficient producers into exporting, or by learning-by-exporting. We argued, however, that by thinking about the mechanisms behind selectivity and learning, our finding of higher premiums for direct exporters and exporters to outside Africa could be interpreted as being consistent with learning-by-exporting effects. This follows since the learning-by-exporting hypothesis would predict higher productivity for these two subgroups, while one could expect the relative strength of selectivity effects to go either way.

Our findings also suggest that, to the extent that learning-by-exporting may take place among the firms in our sample its effect on productivity is difficult to isolate from that of other international technology diffusion mechanisms. These include imported inputs, foreign direct investment, and foreign licensing. The incidence of these foreign links is much higher among exporters as is evident from the estimated export market participation equation. This seems to be the reason why these variables do not enter significantly in the productivity equation in which exporting status is also included. Although it is difficult to draw policy conclusions given that causality between exporting and productivity can not be definitely established, the latter finding also suggests that policies targeted more broadly than the export sector may be appropriate.

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