Evidence on productivity, comparative advantage, and networks in the export performance of firms *†

Luca Antonio Ricci‡ Federico Trionfetti§

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‡International Monetary Fund, Research Department. Email: LRicci@imf.org.

§Aix-Marseille University (Aix-Marseille School of Economics), CNRS & EHESS. Email: Federico.Trionfetti@univ-amu.fr

Evidence on productivity, comparative advantage, and networks in the export performance of firms

This paper tests the effect of firms' comparative advantage, productivity, and networking on firms' probability of exporting. We use a multi-country multi-industry firm level dataset, and construct original measures of comparative advantage. The results show that firms are more likely to export if they belong to the comparative advantage industry, if they enjoy a higher productivity, or if they benefit from foreign, domestic, or communication networks. These results give empirical support the theoretical frameworks developed in the heterogenous-firms and network-and-trade literatures.

JEL codes: F11, F12, F14, L14

Keywords: Heckscher-Ohlin, comparative advantage, new-new trade theory, productivity, firms' export probability, networks.

1 Introduction

Recent theoretical developments and the availability of firms level data has generated an intense research agenda on the export performance of firms. This paper investigates empirically whether such firms' export performance is influenced simultaneously by firms' comparative advantage, productivity, and network connections. It therefore jointly tests three strands of literature.

First, we verify the empirical validity of the Heckscher-Ohlin (HO) model through the effect of comparative advantage on the export probability. Over the past decade, pioneering works by Bernard, Eaton, Jensen, and Kortum (2003) and Melitz (2003) promoted an extensive literature which emphasizes the importance of heterogenous firms in trade models. Within this context, Bernard, Redding, and Schott (2007) build a model that integrates the Heckscher-Ohlin and Melitz structures. One implication of their model is that, under some conditions, the probability of exporting is higher in the industry of comparative advantage. They offer a hint that the comparative advantage influences the probability of exporting appears in a descriptive statistics based on U.S. data provided by Bernard, Jensen, Redding, and Schott (2007, Table2): in industries where the U.S. is likely to have a comparative advantage the percentage of firms who export is higher than in other industries. We provide a systematic investigation on this relationship. More broadly, existing verifications of the HO model are based on the factor content of trade approach or on the production pattern, thus relying on aggregate variables: see, e.g., Leamer (1980), Trefler (1993, 1995), Davis and Weinstein (2001), and Romalis (2004). We instead propose a verification at firm-level. We find a positive relation between comparative advantage and export probability.

Our second contribution is in showing the importance of a variety of network connections on firms export probability. The role of networks in facilitating international trade development has been studied extensively, but mainly via theoretical models or anecdotal evidence, as seen for example in Rodrick (2000), Rauch (2001), Casella and Rauch (2002), Rauch and Trindade (2002), Wagner, Head, and Ries (2002), Rauch and Casella (2003), Combes, Lafourcade and Mayer (2005), Hausmann et al. (2007), and Hidalgo et al. (2007). Networks and connections can be expected to reduce the disadvantage represented by informational barriers hence reducing the cost of international transactions. However, empirical evidence was generally limited to specific countries or networks. In line with this literature, we find that firms are more likely to export if they benefit from foreign networks (financial linkages, joint ventures, foreign ownership), communication networks (E-mail, website), and domestic networks (chamber of commerce, regulation). Firms bear instead a lower probability of exporting if they are affected by state or labor networks (public control and unionization).

Finally, our results also confirm that the probability of exporting is increasing with productivity, a fact that is by now well documented in many studies which often, like ours, employ firm sales as a proxy for productivity; See, e.g., Aitken, Hanson and Harrison (1997), Roberts and Tybout (1997), and Bernard and Jensen (1999, 2004). In these works, firms productivity is a key element in determining the outcome but none of them searches for a complementary explanation based on inter-sectoral differences in the probability of exporting due to comparative advantage.

Quite importantly, we find that all three effects, productivity, comparative advantage, and networks, are simultaneously significant, not just individually.

The paper uses firm-level data from a survey compiled by the World Bank and covering a large group of developing countries and several sectors. It constructs original measures of comparative advantage from firm data for capital and labor, for 32 countries and 24 sectors.

The remainder of the paper is as follows. Section 2 recalls the theoretical background, Section 3 presents the data, Section 4 provides the empirical specification, Section 5 shows the results and Section 6 concludes.

2 Theoretical background.

The literature recalled above posits a relationship between the probability of exporting (our dependent variable) and three explanatory variables: comparative advantage, firm's productivity, and firm's network connections. Across the three strands of literature, the criterion for export decision is captured by the same condition: a firm exports if the profit in the foreign market is non-negative and does not export otherwise. Let r_{xi} and F_{xi} be foreign revenues and fix exporting cost, respectively, for a firm in industry i. It is well known that in Dixit-Stiglitz monopolistic competition, operating profits are given by revenues over the perceived elasticity of demand (typically denoted by σ) minus fixed cost. Using this notation a firm in industry i exports if

$$\frac{r_{xi}\left(\phi, \Bbbk\right)}{\sigma} \geqslant F_{xi}\left(\eta\right) \tag{1}$$

and does not export otherwise. The term on the left-hand side of (1) is the operating profit on the foreign market. which must not fall short of fixed exporting costs if the firm is to export. The relation depends on the role of productvity, ϕ, network connections, η, and comparative advantage captured by $\Bbbk$.

1. Probability of Exporting and Productivity. An increase in productivity, ϕ,increases foreign revenues thus making the firm more likely to export. Therefore:

The probability of exporting is increasing with firm productivity.

2. Probability of exporting and Networks. The degree of network connections, η, is expected to reduce fix exporting costs. Therefore:

A firm with better networking connections has a higher probability of exporting.

3. Probability of exporting and comparative advantage. The relationship between probability of exporting and comparative advantage obtains in a variety of model structures and can be seen very clearly in the model by Bernard, Redding and Schott (2007). Indeed, applying the Pareto distribution of their equation (25) to their Proposition 4b one obtains that the probability of exporting is larger in the comparative advantage industry. The intuition is

as follows. In moving from autarky to costly trade the usual HO specialization mechanism driven by comparative cost advantage takes place. Thus, in both countries firms enter the comparative advantage industry and quit the other industry.[1] This implies that a firm in the industry of comparative advantage of a given country faces tougher competition at home (because of the large mass of firms at home) and weaker abroad (because of small mass of firms abroad) than firms in the other industry[2]. As a consequence, ceteris paribus, foreign sales and foreign profits are relatively larger in the comparative advantage industry than in the comparative disadvantage industry; which makes firms in the comparative advantage industry relatively more likely to export. Thus:

Let $\Bbbk$ be a binary variable that takes the value of one if the firm is in the industry of comparative advantage and takes the value of zero otherwise.Revenues,

profits, and the probability of exporting are positively related to $\Bbbk$.

Ceteris paribus, the ex-ante probability of exporting conditional on successful entry is larger in the industry of comparative advantage.

Let Ψ denote the probability of exporting. The three results above may be summarized in the following relationships to be tested empirically:

$$\Psi = f(\phi,\ \eta,\ \Bbbk) \tag{2}$$

with Ψ depending positively on ϕ, η and $\Bbbk$.

3 Data description.

We use the Enterprise Survey firm-level dataset which is based on a survey organized by the World Bank.

We derive an export dummy (=1 if the firm exports, and 0 otherwise) from the survey based information on whether the firm exports. Tables 1 and 2 present the percentage of firms that export, by country and by industry respectively. Note that about 30 percent of firms in our sample are exporters but the percentage is only 8 percent for smaller firms, is about 25 percent for medium size firms, and is 51 percent for larger firms.

[TABLE 1 AND 2 HERE]

In order to construct original measures of firms' capital labor ratios, we use capital in local currency from the sum of the net book value of "Machinery and Equipment (including Transport)" and the one of "Land, Building and Leasehold Improvements", while employment is measured from the "Average Number of Permanent Workers". We convert sales and capital in dollar terms (via bilateral exchange rates from International Financial Statistics from IMF) for comparability; as we use also country fixed effects in the regressions, such

[1] Consider as Bernard Redding and Schott (2007) a simple structure where there are two goods (X, Y), two factors (K, L) and two countries (H, F) and assume that H has the comparative advantage in Y. Let M_i^C denote the mass of firms in industry i of country c. Comparative cost advantage assures that $M_Y^H/M_Z^H - M_Y^F/M_Z^F > 0$ in autarky. Furthermore, the differences of relative masses increases in moving from autarky to costly trade because of the usual HO mechanism of efficient factor allocation between industries.

[2] With reference to the previous footnonte we note taht $M_Y^H/M_Z^H > M_Y^F/M_Z^F$ implies $M_Z^F/M_Z^H > M_Y^F/M_Y^H$ which means that the mass of foreign relative to domestic firms is smaller in the comparative advantage indutry.

normalizations have no bearing on the results. Figures 1 and 2 present the histograms of the newly constructed capital labor ratios by country and by industry.

[FIGURE 1 AND 2 HERE]

As indicators of firms' size we employ both sales in local currency from "Total Sales" and employment. We carefully check the data for extreme values (dropping few firms whose employment or sales would be reported as larger than national aggregate indicators available in standard macroeconomic databases such as World Bank or IFS), consistency checks (dropping firms where reported categories of employment would not add up to total reported firm employment, or reported categories of capital would not add up to total reported firm capital), and for outliers (observations deviating from the country-industry mean by more than three standard deviations, in log terms). After data cleanup, our data set encompasses about 8,000 firms in 24 industries and 32 countries.[3]

As indicators of networks, we use several measures related to firms' connections via foreign, domestic, communication, state, or unionization networks. See the Appendix table, for descriptive statistics on all variables.

4 Empirical specification.

The empirical methodology adopts the following probit regression

$$\Psi_{cij} = \varsigma_i + \varsigma_c + \xi X_{cij} + \epsilon_{cij} \tag{3}$$

where Ψ_{cij} if the the export dummy for firm j in industry i of country c, and X_{cij} represents the vector of determinants: sales, employment, comparative advantage, and variables related to firms' connections to networks. Regressions include country and industry fixed effects and are estimated with either robust or clustered standard errors.

As a proxy for productivity, we use sales and employment in line with existing empirical literature.[4] As an alternative proxy for total factor productivity, we also jointly introduce in the regressions sales, employment, and the capital/labor ratio, which is somewhat equivalent to entering total factor productivity at the firm level (i.e., the value that would result from regressing sales on employment and capital, controlling for country and industry dummies).

The comparative advantage is determined as in the traditional Heckscher-Ohlin setup, on the basis of the capital and labor indicators. Capital (labor) intensive industries are defined as those where the capital labor ratio of the median firm in the industry is larger (lower) than the capital labor ratio for the

[3] The industries in our sample are: Textiles; Leather; Garments; Agroindustry; Food; Beverages; Metals and machinery; Electronics; Chemicals and pharmaceuticals; Construction; Wood and furniture; Non-metallic and plastic materials; Paper; Sport goods; IT services; Other manufacturing; Accounting and finance; Advertising and marketing; Other services; Retail and wholesale trade; Transport; Mining and quarrying; Auto and auto components; Other transport equipment. The countries in the sample (with the respective year of survey) are: Algeria 2002; Bangladesh 2002; Chile 2004; China 2003; Ecuador 2003; Egypt 2004; El Salvador 2003; Ethiopia 2002; Guatemala 2003; Honduras 2003; India 2000; Kosovo 2003; Kyrgyzstan 2003; Lithuania 2004; Madagascar 2005; Malawi 2005; Mauritius 2005; Morocco 2004; Nicaragua 2003; Pakistan 2002; Philippines 2003; Poland 2003; Serbia 2003; South Africa 2003; Sri Lanka 2004; Tajikistan 2003; Tanzania 2003; Thailand 2004; Turkey 2005; Uzbekistan 2003; Vietnam 2005; Zambia 2002.

[4] See, e.g., Helpman et al. (2004) and Eaton et al. (2008).

median firm in the country. Capital (labor) abundant countries are defined as those where capital labor ratio of the median firm in the country is larger (lower) than the capital labor ratio for the median firm in the data set.[5] The comparative advantage dummy variable takes the value of 1 if a firm either belongs to the capital intensive industry of a capital abundant or to a labor intensive industry of a labor abundant country and takes the value of 0 otherwise.

5 Empirical results.

We first explore, in Table 3, the effect of the most innovative measure of our paper (the proxy for comparative advantage) on the probability of exporting, controlling for proxies of productivity as well as country and industry fixed effects. In order to offer a standard benchmark, the first two columns of Table 3 show univariate probit regressions of the export dummy on productivity (proxied by sales or employment).[6] Both proxies have a positive and significant effect which confirms a result already well established in the literature.

The third column of Table 3 shows the impact of the comparative advantage dummy. The impact is positive and significant as predicted by the model. Column four and five show that both the effects of productivity and that of comparative advantage remain positive and significant when entered jointly. Column six shows that the same qualitative result arises when both proxies for productivity are present in addition to the comparative advantage. The difference with columns 4 and 5 is that coefficients for both proxies of productivity decline when both variables are present, which is not surprising as they are positively correlated with each other. Column 7 adds the capital labor ratio to the regression and shows that our results are robust to such an inclusion. There are two reasons for being interested in entering the capital labor ratio in the regression. First, it is the variable underlying the construction of our measure of comparative advantage, so adding it to the regression addresses possible suspicion that the proxy for comparative advantage may simply be capturing the effect of the capital labor ratio (as in Bernard and Jensen, 1999). The result confirm that this is not the case, which is not surprising, given that the measure of comparative advantage is a highly nonlinear transformation of the ratio. Second, using capital labor ratio at the same time as sales and labor as regressors is equivalent to controlling for another proxy of productivity, i.e., the proxy that would result from regressing sales on capital and labor controlling for country and industry fixed effects: notably, the coefficient for comparative advantage is unaffected either in size or significance.

TABLE 3 HERE.

As our indicator of comparative advantage would be the same for all firms in a country-industry, we cannot include country-industry dummies, but we include country and industry dummies. Moreover, we check whether results change when clustering the errors at the country-industry level. The results presented in Table 4 show that the estimated value and significance of all coefficients remains are remarkably stable. Results are also robust to dropping country and industry effects.

[5] This corresponds to Leamer (1980) definition of relative factor abundance.

[6] The coefficients in the tables with probit regressions represent marginal effect, i.e. the change in the probability for an infinitesimal change in each independent continuous variable.

TABLE 4 HERE.

Tables 5 and 6 show the importance of factors related to firms' connections to networks (in addition to providing evidence of robustness of the results related to comparative advantage). Firms' foreign connections (Foreign financing, Foreign joint venture, and Foreign participation) are all positively related to the probability of exporting. Firms are also more likely to export if they have more advanced communication technologies (Firm uses E-mail and Firm has a web site), or stronger domestic connections, indicated for example by being part of chamber of commerce (Firm part of Chamber of Commerce) or by the time spent dealing with administrative matters related to regulations (Time spent with gov't regulations). Conversely, firms under public control (State participation) or where the labor force is highly unionized (Unionization) tend to export less. Lastly, younger firms tend to be associated with a higher export probability.[7] This is at odd with the literature on advanced economies (see for example Barba Navaretti et al., 2010), where more established firms are more likely to export, and may reflect the more vibrant nature of the developing countries in our sample. When all variables enter the regression simultaneously (last column), they remain highly significant, with the exception of unionization, even if the sample size drops a lot.

The results are again highly robust. In Table 6 we see that the clustering of error terms leaves results unchanged. In particular, the first three rows of Tables 5 and 6 show that firms' size and comparative advantage remain significant as determinant of the export probability when additional variables are included in the regressions.

TABLES 5 and 6 HERE.

6 Conclusions.

What determines the export performance of firms? Recent developments in the vein of Melitz (2003) and implications that may be derived from Bernard Redding Schott (2007) point at productivity and comparative advantage as two key determinants. A separate strand of literature over the past decade has highlighted the importance of networking connections and their informational advantages (e.g., Rauch, 2001, and Casella and Rauch, 2002). The empirical literature has extensively documented the importance of productivity for the export performance of firms. However, evidence of the role of comparative advantage has mainly been indirect (via net factor content of trade, or the predictions of the home market effect and of productions patterns) and its effect on the probability of exporting has not been investigated. Moreover, evidence on the effect of networks is very limited. This paper makes use of a cross-country and multi-sector firm level data to jointly confirm these theories.

In particular, this paper constructs indicators of comparative advantage on the basis of firm level capital labor ratios: capital intensive firms in capital abundant countries or labor intensive firms in labor abundant countries enjoy a comparative advantage compared to their peers. This variable presents a strong positive association with the export performance of firms, even when controlling

[7] Given the presence of fixed effects, the variable related to the age of the firm is automatically equivalent to years since creation.

for country and sector fixed effects, as well for the role of firm' size and various measures of firms connections.

Our results also confirm the importance of networks. Firms are more likely to export if they benefit from foreign networks (foreign financing, joint venture, foreign ownership), communication networks (E-mail, web site), and domestic networks (chamber of commerce, coping with regulation) while their export performance is weaker when the firm is associated with state or labor networks. Younger firms are more likely to export.

The results presented above establish associations between export performance and the regressors of interest: productivity, comparative advantage and network variables. As such, they are not immune from endogeneity concerns. For example, the results do not allow to distinguish whether a firm that has better communication networks finds it easier to export, or whether a firm that decides to export realizes it needs better communication networks. As such, the results suggest key firms' characteristics associated with export performance. However, theory suggests that these associations should reflect causality or necessary conditions.

Looking forward, an ambitious research agenda would enlist merging this dataset with other firm level datasets encompassing more advanced countries and similar sectors, so as to obtain a broader representation of countries, which would favor a better assessment of the comparative advantage.

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Table 1

PERCENTAGE OF FIRMS THAT EXPORTS BY COUNTRY

SIZE	1	2	3	TOTAL
number employees →	1-24	25-99	100+	ALL
Algeria2002	0%	0%	4%	1%
Bangladesh2002	7%	23%	36%	30%
Chile2004	10%	26%	53%	30%
China2003	4%	0%	6%	4%
Ecuador2003	10%	22%	40%	22%
Egypt2004	4%	20%	41%	17%
ElSalvador2003	5%	43%	70%	35%
Ethiopia2002	0%	19%	8%	8%
Guatemala2003	11%	35%	70%	31%
Honduras2003	6%	24%	69%	19%
India2000	47%	58%	67%	60%
Kosovo2003	0%	17%	0%	4%
Kyrgyzstan2003	7%	17%	25%	15%
Lithuania2004	11%	42%	68%	47%
Madagascar2005	0%	0%	75%	69%
Malawi2005	0%	35%	44%	36%
Mauritius2005	0%	33%	67%	40%
Morocco2004	21%	39%	71%	50%
Nicaragua2003	4%	27%	46%	12%
Pakistan2002	8%	10%	25%	10%
Philippines2003	6%	17%	60%	35%
Poland2003	6%	17%	45%	20%
Serbia2003	17%	14%	20%	17%
SouthAfrica2003	29%	38%	54%	46%
SriLanka2004	10%	23%	52%	38%
Tajikistan2003	0%	0%	0%	0%
Tanzania2003	26%	31%	46%	33%
Thailand2004	19%	40%	70%	61%
Turkey-b2005	16%	39%	65%	47%
Uzbekistan2003	6%	0%	0%	2%
Vietnam2005	7%	20%	50%	35%
Zambia2002	21%	18%	51%	31%
ALL countries	8%	25%	51%	31%

Table 2
PERCENTAGE OF FIRMS THAT EXPORTS BY INDUSTRY

SIZE	1	2	3	TOTAL
number employees →	1-24	25-99	100+	ALL
Textiles	7%	22%	46%	30%
Leather	10%	57%	75%	46%
Garments	11%	39%	80%	55%
Agroindustry	23%	27%	56%	38%
Food	7%	24%	43%	26%
Beverages	6%	14%	11%	10%
Metals and machinery	7%	26%	47%	28%
Electronics	15%	16%	62%	43%
Chemicals and pharmaceutics	10%	20%	33%	22%
Construction	7%	7%	10%	8%
Wood and furniture	4%	26%	62%	26%
Non-metallic and plastic materials	9%	21%	43%	24%
Paper	5%	10%	31%	18%
Sport goods	45%	100%	100%	63%
IT services	8%	11%	7%	9%
Other manufacturing	10%	24%	34%	26%
Accounting and finance	0%	0%	0%	0%
Advertising and marketing	0%	0%	0%	0%
Other services	0%	0%	0%	0%
Retail and wholesale trade	0%	100%		8%
Transport	0%	0%		0%
Mining and quarrying	50%	0%	83%	55%
Auto and auto components	17%	19%	21%	20%
Other transport equipment	40%	56%	63%	55%
ALL sectors	8%	25%	51%	31%

FIGURE 1

CAPITAL / LABOR RATIO BY COUNTRY

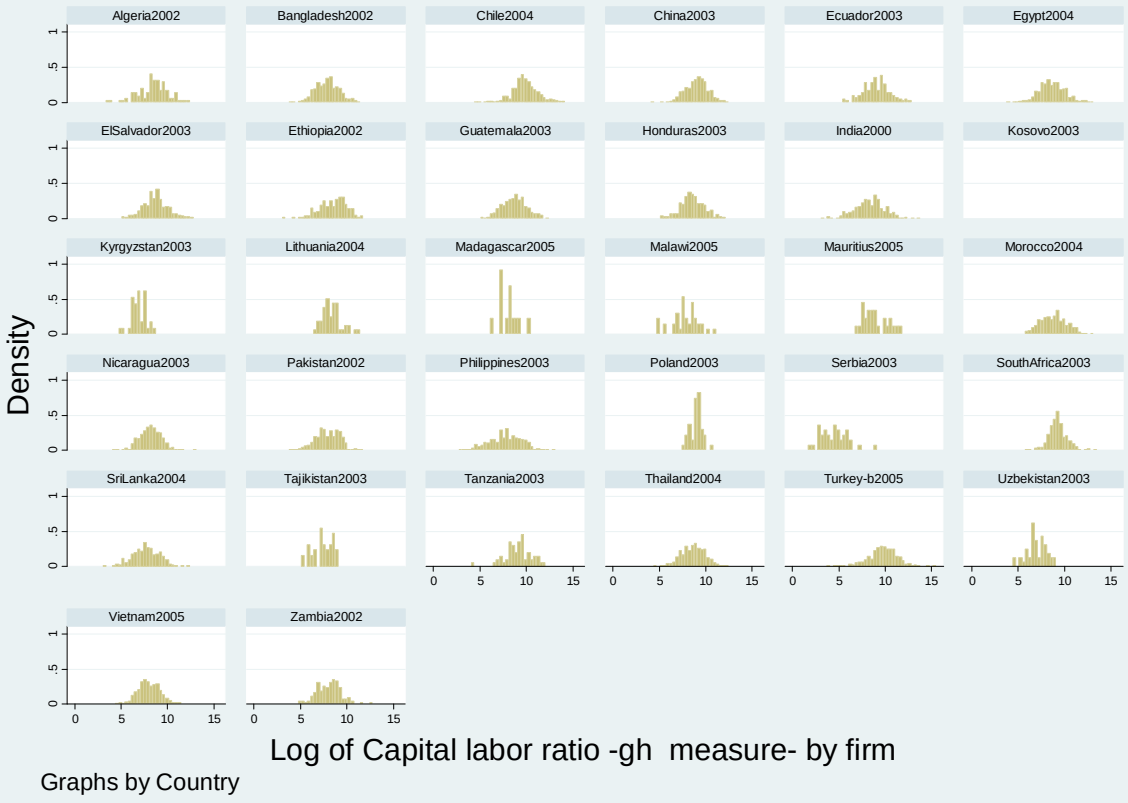

FIGURE 2

CAPITAL / LABOR RATIO BY INDUSTRY

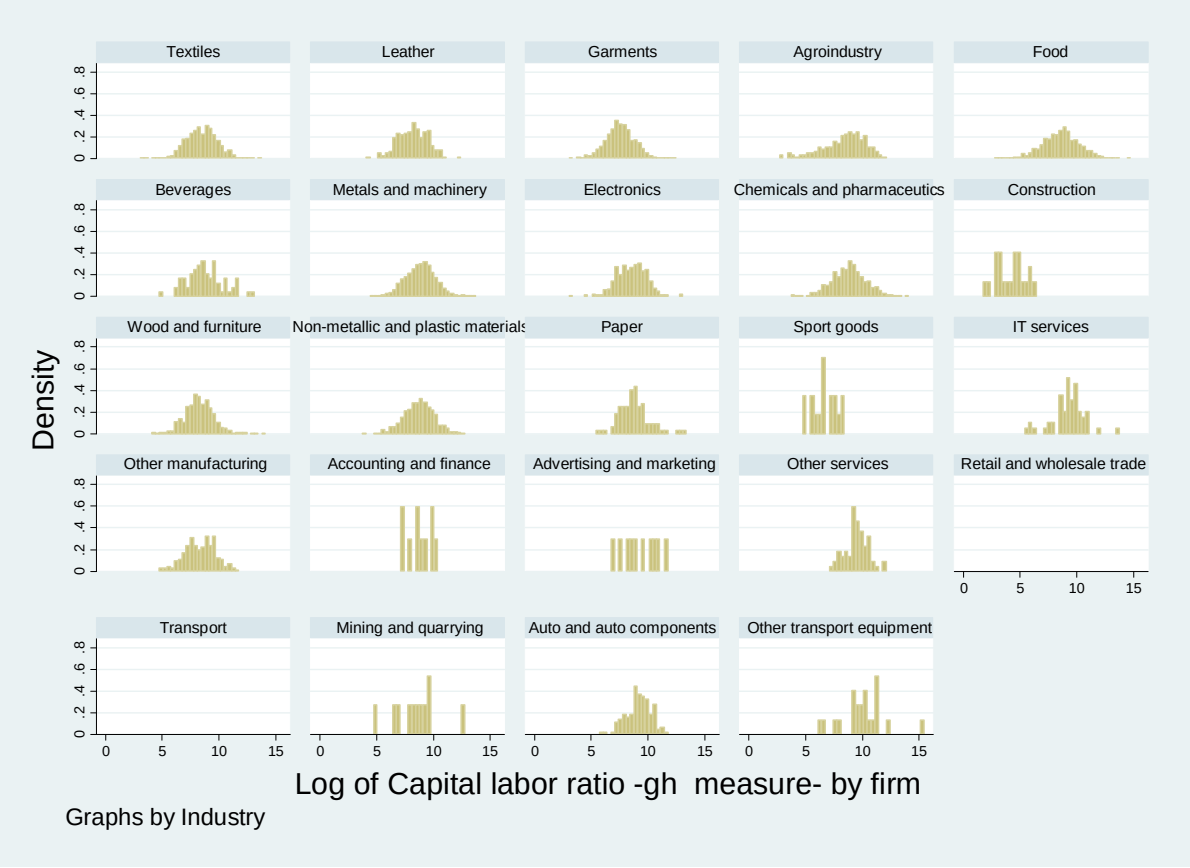

Table 3
The effect of comparative advantage and productivity on the probability of export
Dependent variable: probability of export

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of sales	0.088			0.087		0.045	0.040
	(0.000)***			(0.000)***		(0.000)***	(0.000)***
Log of employment		0.130			0.130	0.080	0.087
		(0.000)***			(0.000)***	(0.000)***	(0.000)***
Comparative advantage			0.088	0.085	0.093	0.089	0.089
			(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Log capital labor ratio							0.012
							(0.016)**
Observations	7742	7822	7822	7742	7822	7742	7742
Pseudo R2:	0.254	0.260	0.165	0.258	0.265	0.275	0.276

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.
Robust p values in parentheses.
Regressions include country and sector fixed effects
Coefficients reflect marginal effects

Table 4
The effect of comparative advantage and productivity on the probability of export
Dependent variable: probability of export
(errors clustered by country-industry)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of sales	0.088			0.087		0.045	0.040
	(0.000)***			(0.000)***		(0.000)***	(0.000)***
Log of employment		0.130			0.130	0.080	0.087
		(0.000)***			(0.000)***	(0.000)***	(0.000)***
Comparative advantage			0.088	0.085	0.093	0.089	0.089
			(0.003)***	(0.003)***	(0.000)***	(0.001)***	(0.001)***
Log capital labor ratio							0.012
							(0.089)*
Observations	7742	7822	7822	7742	7822	7742	7742
Pseudo R2:	0.254	0.260	0.165	0.258	0.265	0.275	0.276

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.
Robust p values in parentheses.
Regressions include country and sector fixed effects
Coefficients reflect marginal effects

Table 5

The effect of comparative advantage, productivity, and networks on the probability of exporting

Dependent variable: probability of export

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Comparative advantage	0.089	0.094	0.080	0.086	0.089	0.093	0.065	0.097	0.087	0.097	0.101	0.102
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Log of sales	0.045	0.046	0.038	0.040	0.035	0.041	0.048	0.048	0.045	0.046	0.053	0.052
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Log of employment	0.080	0.083	0.111	0.079	0.073	0.078	0.061	0.083	0.087	0.095	0.082	0.068
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Foreign financing		0.003										0.003
		(0.000)***										(0.026)**
Foreign joint venture			0.133									0.131
			(0.000)***									(0.002)***
Foreign participation				0.002								0.002
				(0.000)***								(0.000)***
Firm uses email					0.201							0.134
					(0.000)***							(0.000)***
Firm has website						0.131						0.073
						(0.000)***						(0.007)***
Firm part of chamber of commerce							0.097					0.127
							(0.000)***					(0.000)***
Time spent with gov't regulations								0.001				0.002
								(0.011)**				(0.030)**
State participation									-0.002			-0.004
									(0.000)***			(0.010)**
Unionization										-0.001		0.001
										(0.000)***		(0.180)
Years since creation											0.003	0.003
											(0.000)***	(0.000)***
Observations	7742	7325	5699	7695	7371	7253	5922	5991	7695	7246	6817	2356
Pseudo R2:	0.275	0.276	0.250	0.287	0.294	0.281	0.299	0.272	0.280	0.273	0.274	0.281

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Robust p values in parentheses.

Regressions include country and sector fixed effects

Coefficients reflect marginal effects

Table 6

The effect of comparative advantage, productivity, and networks on the probability of exporting

Dependent variable: probability of export

(errors clustered by country-industry)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Comparative advantage	0.089	0.094	0.080	0.086	0.089	0.093	0.065	0.097	0.087	0.097	0.101	0.102
	(0.001)***	(0.001)***	(0.002)***	(0.001)***	(0.001)***	(0.001)***	(0.038)**	(0.003)***	(0.001)***	(0.000)***	(0.000)***	(0.004)***
Log of sales	0.045	0.046	0.038	0.040	0.035	0.041	0.048	0.048	0.045	0.046	0.053	0.052
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Log of employment	0.080	0.083	0.111	0.079	0.073	0.078	0.061	0.083	0.087	0.095	0.082	0.068
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Foreign financing		0.003										0.003
		(0.000)***										(0.036)**
Foreign joint venture			0.133									0.131
			(0.000)***									(0.002)***
Foreign participation				0.002								0.002
				(0.000)***								(0.000)***
Firm uses email					0.201							0.134
					(0.000)***							(0.002)***
Firm has website						0.131						0.073
						(0.000)***						(0.005)***
Firm part of chamber of commerce							0.097					0.127
							(0.000)***					(0.000)***
Time spent with gov't regulations								0.001				0.002
								(0.012)**				(0.032)**
State participation									-0.002			-0.004
									(0.001)***			(0.003)***
Unionization										-0.001		0.001
										(0.000)***		(0.222)
Years since creation											0.003	0.003
											(0.000)***	(0.000)***
Observations	7742	7325	5699	7695	7371	7253	5922	5991	7695	7246	6817	2356
Pseudo R2:	0.275	0.276	0.250	0.287	0.294	0.281	0.299	0.272	0.280	0.273	0.274	0.281

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Robust p values in parentheses.

Regressions include country and sector fixed effects

Coefficients reflect marginal effects

Appendix Table
Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Firm is an exporter [1]	7742	0.32	0.47	0.00	1.00
Log of sales	7742	14.07	2.60	-2.17	24.56
Log of employment	7742	4.29	1.54	0.69	9.85
Firm is in comparative advantage industry [1]	7742	0.53	0.50	0.00	1.00
Log of KL ratio	7742	8.48	1.49	2.78	15.11
Foreign financing [2]	7325	1.05	7.59	0.00	100.00
Firm is in a joint venture with a foreign partner [1]	5699	0.07	0.26	0.00	1.00
Foreign participation [3]	7695	10.14	27.81	0.00	100.00
Firm uses email [1]	7371	0.62	0.49	0.00	1.00
Firm has website [1]	7253	0.35	0.48	0.00	1.00
Firm belongs to a chamber of commerce [1]	5922	0.67	0.47	0.00	1.00
Time spent with gov't regulations [4]	5991	8.61	13.48	0.00	100.00
State participation [5]	7695	5.81	21.57	0.00	100.00
Unionization [6]	7246	19.06	35.30	0.00	100.00
Year firm began operations	6818	1983	18	1838	2004

(1) Dummy variable: 1 if the firm does, 0 Otherwise.

(2) Percentage finance for working capital: foreign-owned banks;

(3) Percentage of firm owned by foreign private sector;

(4) Percentage of senior management's time spent dealing with government regulations;

(5) Percentage of firm owned by the state

(6) Percentage of labor force unionized.