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Ownership and Access to External
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World Market Access of Emerging-Market Firms: the Role of Foreign Ownership and Access to External Finance*

Horst Raff, Natalia Trofimenko

Abstract:

This paper uses micro-data from the World Bank Investment Climate Surveys 2002-2006 to investigate how foreign ownership and access to external finance affect the likelihood of manufacturers in emerging markets to export and/or import. Applying propensity score matching to control for differences across firms in terms of labor productivity, size, etc., we find that foreign ownership and access to external finance are statistically significant determinants of the likelihood that a firm will export or import. Foreign ownership has a large positive impact on the likelihood to engage in direct trade but a negative effect on the likelihood to trade through intermediaries; the effects vary across upper and lower middle income countries. Access to external finance has a modest but positive effect on the likelihood to engage in any of the modes of connecting with foreign customers or suppliers.

JEL classification: F12, F14, F23, O19

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1 Introduction

Access to world markets for imports and exports is generally considered to be one of the necessary conditions for sustained economic growth and poverty reduction in developing countries (see WTO (2001)). Much has been written on the nexus between international trade and growth at the aggregate level and on export-led growth strategies, for instance, of China or the Asian Tiger countries.¹ By contrast, we have little systematic evidence on how firms in emerging markets actually connect with foreign customers and suppliers, and on the factors that may help them do so. The purpose of the current paper therefore is to investigate the role of two potentially important factors, namely foreign ownership and access to external finance, and to investigate how their impact changes with the level of economic development.

We use micro-data from the World Bank Investment Climate Surveys 2002-2006 to establish a causal effect of foreign ownership and access to external finance on the propensity of manufacturing firms to engage in exporting and importing by matching each firm exhibiting one of these factors with a control group of firms from the same industry and country that, in terms of their labor productivity, size and other characteristics, are equally likely to exhibit that factor. We then compare the average export and import propensities of firms exhibiting this factor with the average respective propensities of firms in the control group. In this way we can isolate the effect of foreign ownership and access to external finance over and beyond the effect stemming from firm productivity and size that are already well known to be highly correlated with export and import activities of firms.²

¹See, for instance, Edwards (1993), Frankel and Romer (1999), United Nations (2008), Winters et al. (2004), or Rodrik (2007)). The large literature on the role of trade in alleviating poverty in developing countries is surveyed by Bhagwati and Srinivasan (2002), Goldberg and Pavcnik (2004) and Winters et al. (2004). McCaig (2011) finds a strong causal effect of trade on reducing poverty in Vietnam. See also Topalova (2010) for evidence from India.

²See, for instance, Bernard and Jensen (2004) on the firm-specific determinants of trade. The large literature on firm heterogeneity and selection into exporting and importing is

It is a well established stylized fact that firms generally face substantial "fixed costs" when accessing export and import markets (Roberts and Tybout (1997)). In the case of developing countries there is reason to believe that these "fixed costs" are especially large relative to firms' own capacity to bear them, so that firms depend on the external support that they may draw from, among other things, foreign ownership and external finance. First, firms in less developed countries are less likely to have the technological and marketing know-how and the foreign contacts to identify potential customers and to produce according to these customers' needs. Moreover, they are less likely to be able to link up with overseas suppliers and to make use of foreign intermediate goods. As suggested by a good deal of research conducted by the World Bank and summarized by Keesing (1983), developing country firms have been surprisingly successful in exporting certain types of consumer goods because they received help from overseas buyers that provided contacts and, more precisely, technical, logistical and management capabilities. Similarly, Gereffi (1999) sees the role of 'buyer-driven global commodity chains' as critical to understand why, despite formidable spatial and cultural distances, countries like Japan, South Korea, Taiwan, Hong Kong, Singapore, and now China have been so successful in exporting to Western countries.³ Foreign ownership is only one way to organize this outside support, but it is likely to be an important one (see also Markusen and Trofimenko (2009)). Second, developing countries tend to have poorly developed financial markets, providing limited financing opportunities for firms. Access to external finance therefore is all the more important if firms in these countries are to engage in exporting or importing (see, for instance, Kletzer and Bardhan (1987) or Beck (2002)).

We view foreign ownership and external financing in a wider sense as forms of intermediation of international trade. We also observe in our dataset surveyed by Greenaway and Kneller (2007) and Wagner (2012).

³Feenstra and Hamilton (2006) provide a detailed discussion of the trade strategies of firms in South Korea and Taiwan.

firms that rely on intermediation in a narrow sense, namely by exporting and importing through independent distributors. The use of this indirect as opposed to direct trade is of course correlated with foreign ownership and external financing. First, in foreign-owned firms the distribution of exports and imports is likely to be internalized, i.e., carried out within the firm and therefore not directly observable. We would hence expect foreign-owned firms to rely less on independent distributors. Second, access to external finance may also make it easier for firms to internalize certain functions for which they otherwise would use independent distributors. Hence it is all the more important to be very precise about the way foreign ownership and external finance interact with firms' own capabilities and the use of independent distributors.

We therefore proceed in two steps, namely by building a simple theoretical model to guide our empirical analysis, and then using propensity score matching to control for firms' own capabilities (measured as productivity or size) when quantifying the effects of foreign ownership and external finance. In the theoretical model heterogeneous firms draw on external support (foreign ownership or external finance) when engaging in direct or indirect trade. Selection into direct and indirect modes of trade are thus functions of the firms' own capability and external support. In the empirical analysis we investigate the effect of foreign ownership and external finance on the propensity to export and import both directly and indirectly. And as a robustness check we examine how firms' ability to do business with multinational enterprises or large domestic firms affects their propensity to engage in the various trade modes.

We find that foreign ownership significantly increases the propensity of firms to engage in international trade, namely by approximately 12 percentage points. This is true for both exporting and importing. All of this increase is attributable to direct engagement in foreign trade: as anticipated, foreign-owned firms are significantly less likely to rely on independent dis-

tributors than domestically owned firms. The effect of foreign ownership on the propensity to engage in trade, and especially on exporting, is particularly important for firms in lower middle income countries. In upper middle income countries, the differences between foreign-owned and domestic firms are minimal and not statistically significant, except for imports. We find the impact of access to external finance to be relatively smaller in magnitude but also statistically significant: financially constrained firms are about 6 percentage points less likely to engage in international trade. Access to external finance appears to be equally important in both lower and upper middle income countries.

The paper is related to four strands of literature. First, while there is a large literature that explores trade activities at the firm level, few papers focus on the role of foreign ownership, and if they do they study firms in developed countries.⁴ An interesting exception is a paper by Manova and Zhang (2009) on exports and imports by Chinese firms. That paper shows that foreign-owned firms trade more on average than local privately owned firms and that their trading relationships tend to be more stable. However, it does not attempt to measure the effect of foreign ownership or, for that matter, of external financing on the propensity to engage in trade. Girma et al. (2008) study the role of foreign ownership and financial constraints on Chinese firms, but the emphasis is on innovation activity not trade. Second, there is a quickly growing literature on the role of intermediaries in international trade. The most closely related part of this literature examines the selection of firms into direct and indirect modes of exporting or importing.⁵

⁴See, for instance, Raff and Wagner (2013) on the effect of foreign ownership on the extensive margins of exports of German manufacturing firms.

⁵Among the papers are Abel-Koch (2011), Ahn et al. (2011), Akerman (2010), Blum et al. (2009), Crozet et al. (2013), Felbermayr and Jung (2009), McCann (2010), Petropoulou (2007). Imbruno (2012) discusses direct and indirect modes of importing. Basker and Van (2010), Bernard et al. (2010) and Blum et al. (2010) present empirical evidence on the role of retailers and wholesalers in intermediating trade with developed and developing countries.

But none of these papers considers the role of foreign ownership or access to external finance. Third, our paper contributes to the literature on the role of financial frictions in trade by examining firms from emerging markets and examining the effects on different modes of engaging in trade.⁶ Fourth, there is a large literature on how domestic firms in developing countries may benefit from the presence of multinationals, in particular when it comes to exporting.⁷ However, the emphasis of this literature is on measuring spillovers across firms, rather than on comparing the trade performance of matched domestically controlled and foreign owned firms.

The rest of the paper is organized as follows. In the next section, we present a simple theoretical model to make precise the interaction between firms' internal capabilities and external support from foreign ownership and external finance. In Section 3 we discuss the empirical methodology and how it helps control for the interaction between own capabilities and external support spelled out in the theoretical model. Section 4 presents the data, and Section 5 contains the empirical results. Conclusions follow in Section 6.

2 Theoretical Framework

In this section we develop a simple theoretical framework with heterogeneous firms, based on Chaney (2005), to set the stage for our empirical analysis. The model allows us to identify how foreign ownership and access to external finance interact with the more standard firm-level determinants of foreign-market participation like productivity or size. We focus on foreign market

⁶Prominent papers in this literature are Amiti and Weinstein (2011) who study the effect of the Japanese financial crisis on exports by Japanese firms, and Manova (2012) and Muûls (2008) who study the effect of credit constraints on exports at the aggregate level and on Belgian firms, respectively. Greenaway et al. (2007) examine the link between financial factors and export performance of UK firms.

⁷Görg and Greenaway (2004) provide a survey of the literature. For more trade-related aspects see Swenson (2008), and Mayneris and Poncet (2013).

access for exports, noting that models of firm heterogeneity can be easily adapted to study imports of intermediates (see, e.g., Debaere et al. (2013)) or both imports of intermediates and exports (as in Kasahara and Lapham (2013)).

Consider two symmetric countries, home and foreign. Each country has two industries that use labor as the only input. One industry produces a homogeneous, freely tradable good with a constant unit labor requirement of 1. This is the numeraire good and, since its price is set to 1, we also obtain a wage rate of 1. The other industry produces a continuum of differentiated goods under increasing returns to scale and monopolistic competition.

2.1 Households

Home has L consumers/workers, each endowed with one unit of labor. Individual preferences are given by the utility function

$$U = q_0 + \rho \ln Q_c, \quad \rho < 1, \quad (1)$$

where q_0 denotes the consumption of the numeraire, and Q_c is the aggregate individual consumption of differentiated goods. Letting $q_c(i)$ denote the quantity consumed of variety i , we assume that Q_c takes the following CES form:

$$Q_c = \left(\int_{i \in \Delta} q_c(i)^{\frac{\sigma-1}{\sigma}} di \right)^{\frac{\sigma}{\sigma-1}}, \quad (2)$$

where $\sigma > 1$ is the constant elasticity of substitution between varieties and Δ is the endogenous set of varieties.

Maximizing utility subject to the consumer's budget constraint and aggregating individual demands over the L consumers yields the following total demand for variety i :

$$q(i) = \frac{\rho L}{P^{1-\sigma}} p(i)^{-\sigma}, \quad (3)$$

where $p(i)$ is the consumer price of variety i , and

$$P = \left(\int_{i \in \Delta} p(i)^{1-\sigma} di \right)^{\frac{1}{1-\sigma}} \quad (4)$$

is the CES price index.

2.2 Firms

Firms in each country have access to the same technology. In the differentiated good industry each firm draws a random unit labor productivity $z \geq 0$. When entering the domestic market a firm incurs a fixed cost F_d . To enter the export market a firm has to choose between two strategies: strategy x is to export directly, strategy w is to export indirectly with the help of a domestic wholesaler/intermediary. Strategy x involves a fixed cost of exporting F_x . Going through an intermediary requires a smaller fixed cost, $F_w < F_x$, for instance, because the intermediary is able to spread market access costs across a number of exporters that it represents. The trade-off is that the intermediary has to be paid in kind for each unit that it ships abroad. This iceberg-like cost of intermediation is denoted by $\omega > 1$. Both exporting strategies also involve an iceberg transport cost $\tau \geq 1$. We may hence summarize the cost of producing quantities q_d for the domestic market and q_w or q_x for sale in the foreign market via indirect, respectively direct trade as follows:

$$C_d(q_d) = \frac{q_d}{z} + F_d, \quad (5)$$

$$C_w(q_w) = \frac{\omega \tau q_w}{z} + F_w, \quad (6)$$

$$C_x(q_x) = \frac{\tau q_x}{z} + F_x. \quad (7)$$

Profit maximization in the case of CES demand functions requires a firm with labor productivity z to set a price at a constant mark-up over its marginal

cost, c , so that $p(c) = \sigma c / (\sigma - 1)$. The marginal cost c of supplying output is equal to $1/z$ in the domestic market, $\omega\tau/z$ and τ/z , respectively, in the foreign market. The corresponding profits that such a firm can earn in the respective markets and using the respective modes of delivery are then given by:

$$\pi_d(z) = \frac{\rho L}{\sigma} \left(\frac{\sigma}{(\sigma - 1)zP} \right)^{1-\sigma} - F_d, \quad (8)$$

$$\pi_w(z) = \frac{\rho L}{\sigma} \left(\frac{\sigma\omega\tau}{(\sigma - 1)zP} \right)^{1-\sigma} - F_w, \quad (9)$$

$$\pi_x(z) = \frac{\rho L}{\sigma} \left(\frac{\sigma\tau}{(\sigma - 1)zP} \right)^{1-\sigma} - F_x. \quad (10)$$

2.3 Foreign Ownership and Access to External Finance

We are interested in determining how foreign ownership and access to external finance affect the export market participation of firms and the choice of export mode, w or x ; and we want to separate the impact of these two factors from that of labor productivity. A simple and very useful way to model the effect of foreign ownership or access to external finance is to assume that they allow each firm to draw a random endowment of an asset or ability, A , that may help it to overcome barriers to foreign-market entry. In particular, let A and z be drawn from the joint cumulative distribution $G(A, z)$, and let the marginal distribution of z be given by $G_z(z) \equiv \lim_{A \rightarrow \infty} G(A, z)$.⁸ Modelling foreign ownership and access to external finance as a random draw of ability is useful, precisely because in our data we do not directly observe how much, if at all, an individual firm benefits from these factors.

We formally treat A as an asset that a firm can combine with the profit it earns in the domestic market to pay the fixed cost of exporting directly or

⁸In his model Chaney (2005) interprets A as a liquidity shock and examines how draws of z and A affect the propensity of a firm to export. Our model extends Chaney's by allowing for both direct trade and indirect trade through an intermediary.

through intermediaries:

$$\pi_d(z) + A \geq F_i \quad \text{for } i = w, x. \quad (11)$$

We thus implicitly assume that the firm cannot leverage potential export proceeds to overcome this fixed cost. This market failure can be overcome if the firm has enough A . More precisely, since $\pi_d(z)$ is strictly increasing in z , only a very productive firm may be able to pay F_i without a large endowment of A , whereas a firm with a very low labor productivity may not be able to export indirectly even if A is large.

2.4 Equilibrium

To simplify the characterization of equilibrium we assume that import prices have a negligible effect on the domestic price index. That is, we approximate the price index in (4) by:

$$P \approx \left(\int_{z \in \Delta} p_d(z)^{1-\sigma} dG_z(z) \right)^{\frac{1}{1-\sigma}}. \quad (12)$$

We can then derive the equilibrium in three steps. The first step is to consider firms that do not face any "ability" constraint. For such firms we can use equations (8) to (10) to implicitly define three cut-off levels of labor productivity, \bar{z}_d , \bar{z}_w and \bar{z}_x , at which they would earn exactly zero profit in the domestic market and in the export market using strategies w and x , respectively:

$$\pi_i(\bar{z}_i) = 0 \quad \text{for } i = d, w, x. \quad (13)$$

Assuming, reasonably, that the trade costs and intermediation costs are such that $\bar{z}_d < \bar{z}_w < \bar{z}_x$, we obtain four types of firms.⁹ The most efficient firms, i.e., those with $z > \bar{z}_x$, sell both on the domestic market and export directly to the foreign market. Firms with labor productivity in the range $\bar{z}_w < z \leq \bar{z}_x$

⁹Note that a sufficient condition for $\bar{z}_d < \bar{z}_w$ is simply $F_d \leq F_w$. For $\bar{z}_w < \bar{z}_x$ we require F_x to be sufficiently greater than F_w .

sell at home and export through intermediaries. Firms in the productivity range $\bar{z}_d < z \leq \bar{z}_w$ sell only on the domestic market; and firms with labor productivity $z < \bar{z}_d$ do not sell on either market.

Using (12) in (13) we can derive implicit expressions for these cutoffs. From $\pi_d(\bar{z}_d) = 0$ we obtain

$$\bar{z}_d = \left(\frac{\sigma F_d}{\rho L} \int_{z \geq \bar{z}_d} z^{\sigma-1} dG_z(z) \right)^{\frac{1}{\sigma-1}}. \quad (14)$$

For what follows it turns out to be convenient to define a function $h(\cdot)$ with $h' > 0$ such that

$$\bar{z}_d = h(F_d). \quad (15)$$

Proceeding in the same fashion with the other two cutoffs we have

$$\bar{z}_w = \omega \tau \left(\frac{F_w}{F_d} \right)^{\frac{1}{\sigma-1}} h(F_d), \quad (16)$$

$$\bar{z}_x = \tau \left(\frac{F_x}{F_d} \right)^{\frac{1}{\sigma-1}} h(F_d). \quad (17)$$

Figure 1 shows cutoffs \bar{z}_w and \bar{z}_x as horizontal lines.

The second step is to consider the cut-off levels of labor productivity in the presence of an "ability" constraint, specifically to use (11) to implicitly define $\bar{z}_w(A)$ and $\bar{z}_x(A)$ such that a firm below the respective cut-off cannot export through intermediaries, respectively directly:

$$\pi_d(\bar{z}(A)) + A = F_i \quad \text{for } i = w, x. \quad (18)$$

Using (18) we obtain

$$\bar{z}_w(A) = \left(\frac{F_d + F_w - A}{F_d} \right)^{\frac{1}{\sigma-1}} h(F_d), \quad (19)$$

$$\bar{z}_x(A) = \left(\frac{F_d + F_x - A}{F_d} \right)^{\frac{1}{\sigma-1}} h(F_d). \quad (20)$$

Notice that $\bar{z}_w(A)$ and $\bar{z}_x(A)$ are both decreasing in A with $\bar{z}_w(A) < \bar{z}_x(A)$. These two curves are also shown in Figure 1.

The third step is to combine the "unconstrained" cut-off lines from step 1 that are relevant when firms have sufficient ability with the "constrained" cutoffs from step 2 that are appropriate when firms have little ability. This is also illustrated in Figure 1. First consider the two curves $\bar{z}_x(A)$ and \bar{z}_w , where we have assumed that $(F_d + F_x) > F_x \tau^{\sigma-1}$ so that $\bar{z}_x(0) > \bar{z}_w$ and the two curves intersect at a positive level of A . Firms in the set Ω in Figure 1 thus do not have enough ability to export directly despite the fact that their productivity exceeds \bar{z}_x . However, these firms would be able to export directly, if they had a large enough endowment of A (to the right of $\bar{z}_x(A)$). Put differently, for these firms having more A raises the probability of exporting directly.

Next, consider the two curves $\bar{z}_w(A)$ and \bar{z}_w . In Figure 1 they are drawn assuming that $(F_d + F_w) > F_w (\omega \tau)^{\sigma-1}$ so that $\bar{z}_w(0) > \bar{z}_w$ and the intersection is again at a positive level of A . Firms with a productivity between \bar{z}_w and \bar{z}_x are productive enough to export through an intermediary provided they have a sufficient endowment of A ; those in the set Ψ have insufficient A to export. Hence for firms in this productivity range having more A increases the probability of exporting through an intermediary.

Finally notice that in drawing Figure 1 we assumed that $F_x \tau^{\sigma-1} > (F_d + F_w)$ so that $\bar{z}_x > \bar{z}_w(0)$, meaning that while they do not have enough A to export directly, all firms in Ω are sufficiently productive to export through intermediaries. For these firms raising A implies that they would switch from indirect exporting through an intermediary to direct exporting as A rises. Hence the more A they have, the less likely they are to export through an intermediary.¹⁰

¹⁰It is straightforward to extend this result to the case where $\bar{z}_x < \bar{z}_w(0)$ so that some firms in Ω cannot export directly for lack of A . However, for the remaining firms in Ω the conclusion that they are less likely to export indirectly when A rises still holds.

2.5 Testable Predictions

The model indicates that, if we are to correctly measure the impact of A on a firm's likelihood to export directly, we have to control for the firm's labor productivity z . First, there are two reasons why a firm may fail to export directly: it may be in the set Ω and hence lack ability; or its labor productivity may be below \bar{z}_x , in which case the firm would be unable to export directly even if it had enough A . Hence if we fail to control for the firm's labor productivity we would wrongly attribute too much of its inability to export directly to its lack of A . In other words, we would overestimate the impact of foreign ownership and access to external financing, because firms with too low a labor productivity would not export directly even if they were foreign owned or had access to external financing. Hence the need to account for heterogeneity across firms in labor productivity.

Second, in order to measure the effect of A on the probability that a firm will export through an intermediary we also have to control for the firm's productivity. To see this notice that the firms in Ω are able to export, but do so through intermediaries. However, these firms when given additional A would switch to exporting directly and therefore would be less likely to export through intermediaries. Hence it might seem that foreign ownership or access to external finance may reduce the probability that a firm will be able to export indirectly. But this should not be construed as meaning that these factors are unimportant for the overall ability to export.

Finally, we turn to the model's testable predictions. First, consider how A affects the overall likelihood of exporting. Firms with productivity exceeding \bar{z}_x are more likely to export directly the more A they have, those in the interval \bar{z}_w to \bar{z}_x are more likely to export indirectly the more A they have, whereas firms with productivity below \bar{z}_w do not export. Hence we may state:

Hypothesis 1: Controlling for productivity, a firm is more likely to export (directly or indirectly) the more A it has.

Second, consider the effect of A on the probability that a firm exports directly. Only for firms with productivity greater than \bar{z}_x does an increase in A raise their likelihood of exporting directly. For the other firms A has no effect. Hence we obtain:

Hypothesis 2 Controlling for productivity, a firm is more likely to export directly the more A it has.

Third, consider the relationship between A and the probability that a firm exports through an intermediary. Here we observe that for firms with productivity in the interval \bar{z}_w to \bar{z}_x an increase in A unambiguously raises their likelihood of exporting through an intermediary. However, for firms with productivity exceeding \bar{z}_x having more A may reduce the likelihood of exporting through an intermediary. We summarize this as follows:

Hypothesis 3 For firms with a sufficiently moderate productivity, the likelihood of exporting through an intermediary is increasing in A . But for firms with sufficiently high productivity, an increase in A may reduce the likelihood of exporting through an intermediary.

3 Empirical Methodology

Our model allows us to explain why empiricists observe a large overlap in the productivity distributions of exporters and non-exporters in the data. Specifically, depending on the endowment of “ability”, seemingly equally productive plants may export directly, access foreign markets through intermediaries, or serve only the domestic market. In this study we would like to evaluate the effect of “ability” on accessing foreign markets and we proxy for “ability” with foreign ownership and access to external finance.

Apart from the fact that foreigners may target more productive plants that already meet the threshold requirements for entering foreign markets, foreign ownership can have a further impact on access to foreign markets to

the extent that foreign owners may bring along a wide and well-established distribution network, access to internal financing opportunities, or otherwise contribute to the plant’s endowment of “ability”. Access to external sources of financing is an indicator of financial liquidity, which complements the firm’s productivity draw in determining whether it will be able to access foreign markets. Similar to foreign ownership, financial liquidity is also likely to be tightly interwoven with the firm’s overall performance, with “better” firms having an easier time acquiring bank loans.

This intermingled nature of the relationship between “ability” variables and productivity clarifies why the interaction of “ability” and productivity cannot be studied in a simple regression framework by simply introducing an interaction term into an OLS framework. We use propensity score matching and propensity score reweighting to take into account this imbalance on the covariates, especially productivity, between firms of different “ability” and to reduce the confounding effects of productivity and other covariates.

3.1 Standard Propensity Score Matching

Although other statistical procedures are available to evaluate treatment effects (see, for instance, the propensity score reweighting below), we choose standard propensity score matching as our baseline specification. This choice is motivated by that fact that this method does not rely on the correct specification of the functional form between our treatment and outcome variables; our data set does not provide us with the wealth of information that is generally available in the studies arguing that controlling for more variables is a better alternative to matching estimators; most of the covariates that are available to us are well balanced; and the findings are strongly supported by the propensity score reweighting estimator and provide conservative estimates of the effects.

In our basic setup we pair each firm with “ability” with three otherwise very similar firms but without “ability” based on a number of background

characteristics, the most important being labor productivity. Specifically, we use propensity scores to match each foreign owned firm to 3 domestic firms within the same industry and country that have a similar predicted probability of being foreign owned based on the size of labor force, labor productivity relative to the industry median, existence of plants abroad and location of headquarters. We opt for this 3-to-1 matching due to this estimator’s lower variability at the cost of higher bias in comparison to 1-to-1 matching, since our balancing tests (see the Results section) indicate that bias is not a concern in our sample.

The specification for the matching on access to financing is somewhat different in that we match each firm with access to external sources of financing to 3 firms financing working capital from internal sources within the same industry and country that have a similar predicted probability of having access to external sources of financing based on size of the labor force, labor productivity relative to the industry median, and reporting of cost of financing and lack of access to financing as an obstacle to running a business.

To reduce the dimensionality problem when considering the differences on so many observable characteristics, these characteristics are summarized into a single scalar (propensity score) reflecting the probability of a firm to possess “ability”. In a 3-to-1 matching, three firms without “ability” but with a similar propensity score as a firm with ability will then be used as the missing counterfactuals and will help us to answer the question: “Would a firm with ‘ability’ and with a given set of characteristics engage in exporting and/or importing had it not been endowed with ‘ability’, and—if so—would it trade directly or indirectly through intermediaries?”

3.2 Propensity Score Reweighing

Recent empirical studies indicate that Nearest Neighbor Matching techniques may be less efficient than the use of larger samples of untreated observations

with different weights assigned to each plant.¹¹ We therefore also use the propensity score reweighting estimator due to Hirano et al. (2003) which has been shown to generate an efficient estimate of the average treatment effects on the basis of reweighting by the inverse of the propensity score. Intuitively, this method adjusts for differences between firms with “ability” and without “ability” by assigning higher weights to firms that are more similar to the firms in the treatment group. Rather than completely dismissing firms that are not very similar, this method simply assigns a lower weight to such observations. In what follows, we demonstrate the use of the method for our first indicator of “ability”: foreign ownership. We proceed in exactly the same manner for access to external finance.

In the first step we estimate a probit model of foreign ownership of a firm in country i and industry j :

$$F_{ij} = \alpha + \beta X_{ij} + d_i + d_j + \varepsilon_{ij},$$

where $F_{ij} = 0$ if the foreign ownership share equals zero, and $F_{ij} = 1$ otherwise, and where X_{ij} is a vector of covariates that we believe to be correlated with the ownership form of the firm. X_{ij} includes first of all the variables from the standard propensity score estimation: size of the labor force, labor productivity relative to the industry median, existence of plants abroad, location of headquarters, reporting of cost of financing and lack of access to financing as an obstacle to running a business. In addition, we include plant age, percentage of college educated labor force, R&D expenditure, the use of external auditing for financial statements and the existence of ISO certification. We also include dummy variables d_i and d_j to control for country and industry, respectively.

Having obtained marginal probabilities of being foreign owned, p_f , we weigh each foreign owned firm by 1 and each domestically owned firm by $p_f/(1 - p_f)$ to obtain the average treatment effects on the (treated) foreign

¹¹See, for instance, Black and Smith (2004), and Lechner and Wunsch (2013).

owned firms and by $1/p_f$ and by $1/(1-p_f)$ to obtain the population average treatment effects. In the tables, we report the average treatment effects on the treated; population average treatment effects are available upon request.

3.3 Extensions

We anticipate that the endowment of “ability” will have different effects across countries depending on their level of development and explore this hypothesis by conducting the analysis separately for lower- and upper- middle income countries.¹² We also explore other proxies for a firm’s endowment of “ability”. Specifically, we consider firms’ sales to multinational companies (MNCs) operating in the home market (and independent of the firm in question) as a proxy for the firms’ networking ability and access to better, more sophisticated and demanding clients that may be indicative of a firm’s ability to meet higher product quality standards and more stringent delivery or other rules. Networking with MNCs can also provide the firm with access to these firms’ distribution channels and thus affect a firm’s ability to engage in international trade. To test whether by looking at trade with MNCs we are not simply capturing “large client” effects, we also conduct the analysis using “trade with large domestic partners” as a proxy for “ability”.

4 Data and Summary Statistics

We use firm-level data collected by the World Bank as part of the Investment Climate Surveys project (for more information about the surveys visit <http://www.enterprisesurveys.org>). The sample for each country is representative of the population of firms according to their industry and location.

Our final sample contains 9,244 plants from 13 countries and 11 indus-

¹²We also investigated whether there are differences in the magnitudes of the effects across industries by considering light and heavy industries separately, but could not find any consistent differences.

tries.¹³ Although the data base collects information on a wide variety of countries, including both low- (as most African economies) and high-income (such as Poland or Hungary) economies, we limit our sample to middle-income countries: Egypt, El Salvador, Guatemala, Honduras, India, Morocco, Nicaragua, Philippines, and Vietnam (lower middle income) ; Brazil, Chile, Ecuador, and South Africa (upper middle income). The reason for this restriction is data-driven: only these countries provide enough observations with complete information across all variables of interest after we clean the data for missing values, obvious errors and outliers.¹⁴ The data cover light industries (textiles, leather, garments, and food) and heavy industries (auto and auto components, chemicals, electronics, metals and machinery, non-metallic and plastic materials, paper, wood and furniture). The data cover the period 2002 to 2006, but the plants are not followed up in later years, so the data do not constitute a panel.

The survey records information on a number of plant characteristics, such as the plant's location, industry, ownership structure, employment, etc. The survey also records detailed information on the distribution of sales between domestic and foreign markets, where foreign sales are broken down into direct and indirect exports (exports through a distributor). On average 37% of plants are exporters, ranging from 23-24% in industries like "auto and auto components" to 50% in "garments". About three quarters of exporters do so directly, and around 15% indirectly. The share of plants that export only through distributors is as low as 10% in industries "metals and machinery", "electronics" and "chemicals and pharmaceuticals" and as high as 20% in industries like "food", "textiles", "furniture" and "other manufacturing

¹³The data are provided at the establishment (plant) level and we use "firm," "plant" and "establishment" interchangeably.

¹⁴We defined outliers based on the values of studentized residuals from regressions with dependent variables defined as shares of direct and indirect exports and imports, and independent variables given by relative productivity and other firm characteristics, such as size, age, foreign ownership, etc. Observations with studentized residuals falling outside of the (-2.5; +2.5) interval are defined as outliers.

goods”. The remaining 10% of exporters engage in both modes of exporting. On average 40% of plants are importers, ranging from 14% in “auto and auto components” to over 50% in “paper”. About 55% of importers import directly and about 30% import only through distributors, with the remaining 15% engaging in both modes of importing. Whereas only 4% of importers in “auto and auto components” engage in both modes of importing, in other industries the numbers are closer to 10% (20% in “chemicals and pharmaceuticals”). About one fifth of firms engage in exporting and importing simultaneously, especially in industries like textiles, leather, and garments (26, 29 and 34 percent respectively).

Export intensity varies between industries, from the median of about 10% of output in “paper” to nearly 100% in “garments” and “leather”. In general, plants that export only directly export a higher share of their production than the indirect exporters do, although there is a large variation in the size of the gap between industries: from a couple of percent in “beverages” to 20-30% in “electronics”. The gaps between direct and indirect traders are even more conspicuous when we look at importers, although there are large cross-industry differences, just as in the case of exporters.

We define a firm as foreign owned if it reports a positive share of ownership by foreigners. Based on this definition, about 7 % of plants in the sample are foreign owned. Most foreign owned plants are in garments, foods, metals & machinery and chemicals (these four industries accounting for nearly 35% of all foreign owned plants). Access to external sources of financing is based on the share of loans from local commercial banks, foreign owned commercial banks and leasing arrangements in financing working capital. About 38 percent of plants report non-zero values for these types of funding for their working capital. Exporters and importers are about 12 percent more likely to be financing their working capital from external sources.

Approximately 10% of plants engage in trade with multinational companies located in the plant’s home country. It is important to emphasize that

sales to MNCs cannot reflect intra-firm trade, because if a firm were part of a multinational company intra-firm trade would be captured by the variable “sales to the parent company or subsidiaries”. The proportion of plants trading with MNCs is particularly high in “auto and auto-components” (24% of firms in the industry) and in “metals and machinery” (20%). In fact, of all 984 plants that report trading with MNCs a third are plants from “metals and machinery”. Exporters are somewhat more likely to engage in trade with MNCs than non-exporters: being an exporter increases the probability of a plant also engaging in trade with MNCs by about 30%. The extent to which a plant engages in trade with MNCs also seems to depend on the foreign ownership status: 20 percent of foreign owned plants and 10 percent of domestic plants sell to MNCs.

Slightly over a quarter of the plants in our sample report non-zero trade with large domestic enterprises. This trade is somewhat more common among foreign owned plants and exporters (approximately 30 percent versus 26 percent, respectively).

5 Results

5.1 Estimates from Standard Propensity Score Matching

As Table 1 indicates, foreign owned and domestic firms widely differ in their propensity to engage in international trade, especially directly. In an unmatched sample, the difference can be as large as 50 percentage points. A lot of this difference does disappear once we take into account the differences in productivity, size of the labor force and other relevant firm characteristics. When we look at the entire pool of domestically owned firms, we see that the propensity to engage in trade among them is fairly low. It is only after we focus on the subgroup of domestically owned firms that are very similar to the foreign owned ones that we see a higher propensity to trade. But the

outcome of the matching procedure reported in the last column of the table shows that an economically sizeable and statistically significant difference in terms of engagement in international trade still exists for the two groups of firms. Consistent with Hypothesis 1, foreign owned firms are about 11 percentage points more likely to engage in trade than domestic firms (the differences are nearly identical for exporting and importing). This is true particularly for the engagement in direct trade (in line with our Hypothesis 2): the propensity to engage in direct trade is about 82 percent for foreign owned firms and only 67 percent for domestic firms. Foreign owned firms are also about 12 percentage points more likely to engage in both exporting and importing than domestic firms.

In Table 2 we investigate the role that access to external sources of financing plays in allowing firms to engage in trade. Financially constrained firms are less likely to engage in trade across all categories. Similar to the earlier case, the differences in the propensity to trade between financially constrained and unconstrained firms are larger in the unmatched sample, suggesting that firms with access to external sources of financing are inherently different from financially constrained firms in terms of size, productivity and their views on the cost of financing and access to finance as obstacles to doing business. These inherent differences, however, are not nearly as large as those between foreign owned and domestic firms, as evidenced by much smaller changes in pre- and post-matching propensities for the “untreated” group (i.e. financially constrained firms) in the current analysis as compared to the previous one on foreign ownership. The magnitudes of the effects in the matched sample are moderate but highly significant, i.e., there is a small—never exceeding 6 percentage points—but persistent effect of access to financing on engagement in international trade.

One notable difference between Tables 1 and 2 is the switch in how our measure of “ability” affects engagement in trade through intermediaries: whereas the impact is positive in the case of access to external financing, it

is negative in the case of foreign ownership. This suggests that multinationals internalize at least some of the roles intermediaries play in international trade. But notice from Table 3 that in terms of relative productivity and firm size (usually a good proxy for efficiency), matched samples in the two cases are different: the sample of foreign-owned and matched domestic firms consists of larger and more productive firms than the firms in the matched access to financing sample. Hence, our finding that the coefficient switches sign is also in line with our Hypothesis 3, which states that for firms with a sufficiently moderate productivity, the likelihood of exporting through an intermediary is increasing in “ability”; but for firms with sufficiently high productivity, an increase in “ability” may reduce the likelihood of exporting through an intermediary.

Of course, validity of our findings is dependent on the quality of the matching. As Table 3 indicates, the samples we want to compare are indeed very different in terms of observables. However, the reduction in bias after matching for both treatment variables (foreign ownership and access to external financing) was successful, since most of the covariates are well balanced. The general requirement for the bias after the matching is to be less than 5%, and we find that with the exception of “plants abroad” in the first panel of Table 3, where the bias slightly exceeds this limit, this requirement has been met. The matching in case of the access to external financing has been even more successful with the values of the bias on all covariates well under the acceptable limit.

5.2 Estimates from the Propensity Score Reweighting Estimator

One of the disadvantages of the standard propensity score method is the fact that it discards a lot of the potentially useful information in the sample. For example, in our case of 3-to-1 matching for a set of 605 foreign owned firms in a sample of 9,244 firms, only 1815 (3×605) domestic firms would

be included in the analysis, and this is only if a good match is found for each foreign owned firm. So, only about a quarter of the surveyed firms will be used in the analysis. In Tables 4 and 5 we repeat our analysis of the impact of foreign ownership and access to external financing on engagement in trade for a significantly larger sample of 6967 firms (some observations drop out due to non-reporting of the additional controls that we include in the analysis). Including additional control variables does affect the results of the balancing tests: the bias on ISO certification, and educated labor force and especially on plant age goes beyond the 5% cut off, which justifies the use of the propensity score reweighting estimator.

The first thing to note about the results in Tables 4 and 5 is the remarkable similarity to the effects found in our standard propensity score analysis. Foreign ownership and access to external sources of financing unambiguously boost engagement in direct international trade, with the effect of foreign ownership at least triple the size of the effect of access to external financing. Unlike moderately significant findings in the standard propensity score analysis, all propensity score reweighting estimates are significant at the 1% significance level.

Tables 4 and 5 also show other factors to be strongly correlated with engagement in international trade. In line with expectations, larger and more productive firms are more likely to engage in exporting and importing, especially directly. The effects of R&D expenditure and the use of educated labor are moderate, contrary to expectation. New to the literature on firm-level determinants of trade are the use of ISO certification (as a proxy for product quality) and the indicator of whether a firm uses external audit (as a proxy for reputation). Both variables have a moderate positive effect on direct engagement in international trade. Existence of plants abroad and location of headquarters in other countries have statistically strong and economically large effects; like foreign ownership these are indicators that the plant is part of an MNC.

5.3 Extensions

In Tables 6-8 we break down the analysis for lower and upper middle income countries and consider alternative factors that could be related to the firm’s endowment of “ability”. Given the similarity between the standard propensity score and reweighting estimates, we choose to report the findings from the former one, because they provide conservative estimates of the effects.

In Table 6 we investigate whether the impact of foreign ownership on the propensity to engage in trade is similar across different country groupings. Specifically, we investigate the differences between lower and upper middle income countries. Foreign owned firms are more likely to engage in international trade only in lower middle income countries (by 17 percentage points in the matched sample). The difference between foreign owned and domestic firms is much smaller in upper middle income countries—primarily due to much higher engagement in international trade by domestic firms—and its size shrinks and the statistical significance disappears once we employ matching. When we break down trade by type, we see that this finding is driven primarily by similar propensity of foreign owned and domestic firms to export. Whereas in lower middle income countries foreign firms are more likely to engage in all types of international trade, in upper middle income countries foreign owned firms are only significantly more likely to import and, when they import, they are more likely than domestic firms to do so directly. Propensity to both export and import is higher for foreign owned firms, irrespective of the country’s development level.

In Table 7 we look at the effect of access to external sources of financing across different country groupings. The first thing to notice is that whereas in upper middle income countries about half of the firms are financially constrained, their proportion in lower middle income is much higher (about 70 percent). Overall, the differences in the magnitude of the effects between upper and lower middle income countries are minor; nonetheless the effects are much more statistically significant for lower middle income countries. In

particular, engagement in importing depends on access to external finance only in lower middle income countries.

In Table 8 we conduct a robustness check and look at two more indicators of “outside/external support” or “ability”: doing business with MNCs operating in the local market and with large domestic partners, respectively. Comparing the second column of the top and the bottom panels of Table 6 (the analyses before matching), we see that the firms who do not have MNCs or large domestic firms as clients are remarkably similar in the propensities to engage in international trade. Similar comparison of the first column suggests that the firms who do business with MNCs are somewhat more likely to engage in international trade than those with large domestic partners. After restricting the sample through the matching procedure, the differences between firms with “external support” and without—be it in the form of large domestic partners or MNCs—decrease dramatically and are driven primarily by importing behavior, with no differences in exporting. Firms without “external support” also seem to rely less on independent distributors and to trade through intermediaries. What this suggests is that contrary to the expectation that having MNCs as clients could be another source of “ability”, it seems to be that there is no particular benefit to having them as clients and that it is rather the size of the trading partner that matters. It is possible that large trading partners—be they domestic or multinational—may have some specific product quality requirements and that firms meet those by using imported intermediate goods.

6 Conclusions

The paper used micro-data from the World Bank Investment Climate Surveys to study how manufacturing firms in emerging markets connect with foreign customers and suppliers. In particular, we examined the role of two factors in this process, namely foreign ownership and access to external finance. We

discovered that both factors have a statistically significant and in many cases economically large impact on the world market access of emerging market firms.

Foreign owned firms are 11 percentage points more likely to engage in trade than domestically owned firms. This premium of foreign owned firms in the propensity to trade is especially big when it comes to direct trade, namely 15 percentage points. The impact of access to external finance is smaller but persistent, with firms reporting access to external sources of financing being up to 6 percentage points more likely to engage in foreign trade.

While foreign owned firms are significantly more likely to trade than matched domestic firms, they are around 4 percentage points less likely to export or import through intermediaries. Apparently MNCs internalize at least some of the intermediation functions that are important to international trade. This role of MNCs in matching buyers and sellers in international markets is especially important for lower middle income countries, with foreign owned firms being 17 percentage points more likely to engage in direct international trade in the matched sample than domestic firms. By contrast, foreign ownership conveys no such advantage in upper middle income countries, at least when it comes to exporting, which suggests that the export support foreign owners can bring is especially important for countries with a low level of economic development but vanishes as countries become developed. Foreign ownership remains an important factor in the propensity to import even in upper middle income countries.

The effect of access to external finance has a similar magnitude in both upper and lower middle income countries. Nonetheless the effects are much more statistically significant for lower middle income countries. In particular, engagement in importing depends on access to finance only in lower middle income countries.

Overall the evidence presented in the current paper suggests that world

market access of emerging-market firms benefits significantly from external support, specifically from the intermediation provided by foreign owners. This is also supported by the finding that simply doing business with independent MNCs operating in the country provides no advantage to firms when it comes to trade: there is no effect on the propensity to export, and the propensity to import is boosted to the same extent as having a large domestic client. These results have obvious implications for economic policy, suggesting in particular that foreign ownership plays an important role in facilitating international trade.

This role, however, has recently been put under strain by the financial crisis. According to UNCTAD (2011, Table I.1), world outflows of foreign direct investment (FDI) were 46% lower in 2009 compared to 2007, with the drop in outflows from developed countries exceeding 50%. The direct acquisition of ownership in foreign companies through cross-border mergers and acquisitions fell even more during this period, namely by over 75% measured in net purchases (UNCTAD, 2011, Table I.3). Moreover, FDI flows have so far been very slow to recover. Given the importance of foreign owners in intermediating exports especially from lower middle income countries, the financial crisis may have long-term negative effects on developing country trade over and above the effects stemming from the obvious difficulties of firms to gain access to external sources of finance.

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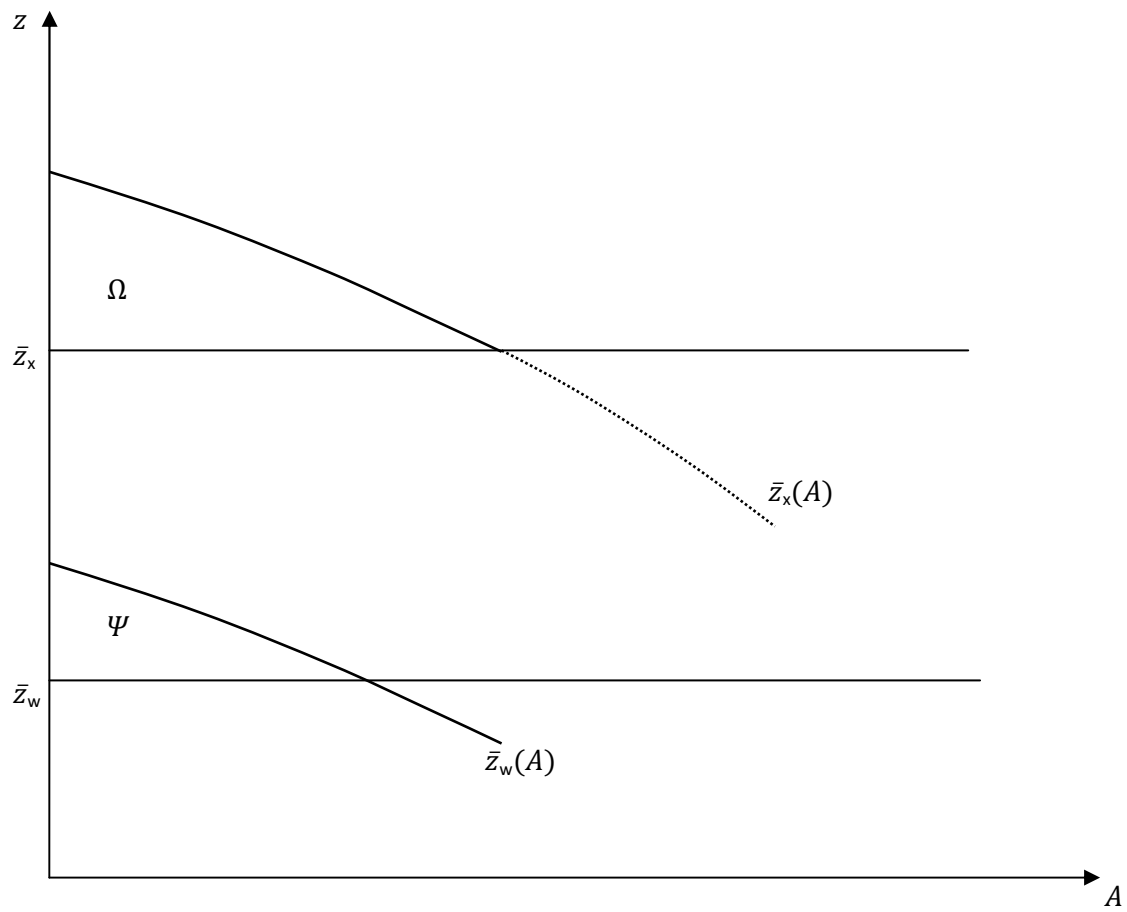


Figure 1

Table 1: Effects of Foreign Ownership on Engagement in Trade (Means and [Bootstrapped] Standard Errors for [Post-Matching] Effects)

	Middle Income Countries (N=9,244: Foreign Owned 605, Domestic 8,639)					
	Before Matching			After Matching (3-to-1 NN PS)		
	Foreign Owned	Domestic	Effect Size	Foreign Owned	Domestic	Effect Size
International Trade	0.846	0.343	0.503 (0.020)	0.846	0.728	0.118 (0.033)
Exporting	0.760	0.252	0.508 (0.018)	0.760	0.623	0.136 (0.034)
Importing	0.604	0.197	0.407 (0.017)	0.604	0.492	0.111 (0.033)
Exporting & Importing	0.511	0.100	0.411 (0.013)	0.511	0.389	0.123 (0.034)
Use of Intermediaries in Trade	0.159	0.146	0.012 (0.015)	0.159	0.203	-0.044 (0.030)
Trade Through Intermediaries	0.050	0.108	-0.058 (0.013)	0.050	0.094	-0.045 (0.020)
Direct Trade	0.820	0.258	0.562 (0.018)	0.820	0.670	0.150 (0.026)
Direct Exporting	0.736	0.217	0.519 (0.017)	0.736	0.590	0.145 (0.029)
Direct Importing	0.576	0.118	0.458 (0.014)	0.576	0.437	0.139 (0.041)

Table 2: Effects of Access to External Finance on Engagement in Trade (Means and [Bootstrapped] Standard Errors for [Post-Matching] Effects)

	Middle Income Countries (N=9,244: Unconstrained 3,501, Constrained 5,743)					
	Before Matching			After Matching (3-to-1 NN PS)		
	Access to External Finance	Finance Constrained	Effect Size	Access to External Finance	Finance Constrained	Effect Size
International Trade	0.473	0.317	0.156 (0.010)	0.473	0.413	0.060 (0.017)
Exporting	0.357	0.242	0.115 (0.010)	0.357	0.312	0.045 (0.014)
Importing	0.281	0.189	0.092 (0.009)	0.281	0.231	0.050 (0.013)
Exporting & Importing	0.159	0.109	0.051 (0.007)	0.159	0.131	0.028 (0.013)
Use of Intermediaries in Trade	0.199	0.115	0.084 (0.008)	0.199	0.169	0.030 (0.014)
Trade Through Intermediaries	0.143	0.080	0.063 (0.007)	0.143	0.115	0.028 (0.011)
Direct Trade	0.367	0.252	0.115 (0.010)	0.367	0.325	0.042 (0.016)
Direct Exporting	0.314	0.213	0.100 (0.009)	0.314	0.275	0.039 (0.013)
Direct Importing	0.175	0.133	0.043 (0.008)	0.175	0.157	0.019 (0.013)

Table 3: Balancing Test Results and Comparison of Samples on Covariates

Variable	Sample	Foreign Ownership		
		Mean Treated	Mean Control	%Bias
Log(Employment)	Unmatched	5.193	3.591	117.1
	Matched	5.193	5.241	-3.5
Labor Productivity Relative to the Industry's Average	Unmatched	1.132	0.987	63.5
	Matched	1.132	1.139	-2.9
Number of Plants Abroad	Unmatched	0.250	0.026	68.5
	Matched	0.250	0.231	5.9
Location of Headquarters	Unmatched	0.860	0.927	-21.9
	Matched	0.860	0.863	-0.9
Share of Domestic Sales going to Parent Company or Subsidiaries	Unmatched	0.032	0.015	12.5
	Matched	0.032	0.037	-3.3
<u>Access to External Financing</u>				
Variable	Sample	Mean Treated	Mean Control	%Bias
Log(Employment)	Unmatched	4.008	3.509	37.2
	Matched	4.008	4.011	-0.3
Labor Productivity Relative to the Industry's Average	Unmatched	1.021	0.981	17.8
	Matched	1.021	1.024	-1.3
Reported Cost of Financing as an Obstacle to Business	Unmatched	0.325	0.280	9.6
	Matched	0.325	0.317	1.5
Reported Access to Financing as an Obstacle to Business	Unmatched	0.265	0.249	3.5
	Matched	0.265	0.253	2.7

Note: additional covariates are industry and country dummies

Table 4: Effects of Foreign Ownership on Engagement in Trade: Weighted Propensity Score

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Engagement in Trade	Exporting	Importing	Exporting & Importing	Use of Intermediaries	Trade Only Through Intermediaries	Direct Trade	Direct Exporting	Direct Importing
Foreign Ownership	0.140*** (0.017)	0.144*** (0.022)	0.136*** (0.021)	0.189*** (0.024)	-0.072*** (0.020)	-0.037*** (0.011)	0.151*** (0.020)	0.159*** (0.023)	0.210*** (0.023)
Log (Employment)	0.119*** (0.004)	0.123*** (0.004)	0.067*** (0.004)	0.061*** (0.003)	0.012*** (0.004)	-0.010*** (0.003)	0.135*** (0.004)	0.122*** (0.004)	0.069*** (0.003)
Relative Productivity	0.250*** (0.021)	0.191*** (0.020)	0.163*** (0.019)	0.102*** (0.013)	0.049** (0.019)	-0.004 (0.015)	0.248*** (0.019)	0.186*** (0.018)	0.117*** (0.014)
Existence of Plants Abroad	0.071*** (0.019)	0.238*** (0.023)	0.122*** (0.022)	0.208*** (0.019)	-0.036* (0.022)	-0.091*** (0.013)	0.231*** (0.022)	0.260*** (0.023)	0.154*** (0.019)
Location of Headquarters	-0.220*** (0.023)	0.014 (0.022)	-0.343*** (0.021)	-0.095*** (0.015)	-0.176*** (0.021)	-0.121*** (0.017)	0.101*** (0.021)	0.016 (0.020)	-0.174*** (0.016)
Sales to Subsidiaries or Parent Company	-0.009 (0.038)	-0.084** (0.036)	0.015 (0.035)	-0.058** (0.025)	0.043 (0.035)	0.004 (0.029)	-0.066* (0.034)	-0.094*** (0.033)	0.002 (0.026)
Reporting Cost of Financing as an Obstacle to Doing Business	0.049*** (0.016)	0.018 (0.015)	0.046*** (0.014)	0.017* (0.010)	0.018 (0.014)	0.010 (0.011)	0.032** (0.014)	0.027** (0.013)	0.019* (0.010)
Reporting Access to Financing as an Obstacle to Doing Business	-0.019 (0.015)	0.001 (0.014)	-0.030** (0.013)	-0.006 (0.009)	-0.018 (0.014)	-0.000 (0.012)	-0.001 (0.013)	0.003 (0.013)	-0.007 (0.010)
Age	0.001* (0.000)	0.001** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.001* (0.000)	0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Share of College Educated Labor	0.002*** (0.000)	0.000 (0.000)	0.003*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.002*** (0.000)
Research & Development Expenditure	0.010*** (0.002)	0.013*** (0.002)	0.003* (0.002)	0.002* (0.001)	0.012*** (0.002)	0.004*** (0.001)	0.010*** (0.002)	0.011*** (0.002)	-0.000 (0.001)
Use of External Audit	0.036*** (0.013)	0.018 (0.011)	0.020* (0.011)	0.004 (0.008)	0.003 (0.011)	-0.003 (0.010)	0.032*** (0.011)	0.023** (0.011)	0.015* (0.008)
ISO Certification	0.082*** (0.014)	0.093*** (0.013)	0.007 (0.013)	0.033*** (0.009)	0.007 (0.013)	-0.013 (0.010)	0.096*** (0.013)	0.099*** (0.012)	0.026*** (0.010)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Engagement in Trade	Exporting	Importing	Exporting & Importing	Use of Intermediaries	Trade Only Through Intermediaries	Direct Trade	Direct Exporting	Direct Importing
Share of State in Ownership	-0.051 (0.053)	-0.092** (0.047)	0.047 (0.045)	0.046 (0.031)	0.012 (0.046)	0.054 (0.042)	-0.060 (0.045)	-0.071* (0.042)	0.057* (0.032)
Constant	-0.121** (0.050)	-0.600*** (0.046)	0.247*** (0.045)	-0.185*** (0.031)	0.458*** (0.045)	0.505*** (0.036)	-	0.606*** (0.044)	-0.656*** (0.042)
Observations	6,967	6,967	6,967	6,967	6,967	6,967	6,967	6,967	6,967
R-squared	0.406	0.323	0.291	0.220	0.100	0.095	0.395	0.337	0.283

(Table 4 Continued)

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

Table 5: Effects of Access to Financing on Engagement in Trade: Weighted Propensity Score

VARIABLES	(1) Engagement in Trade	(2) Exporting	(3) Importing	(4) Exporting & Importing	(5) Use of Intermediaries	(6) Trade Only Through Intermediaries	(7) Direct Trade	(8) Direct Exporting	(9) Direct Importing
Access to External Sources of Financing	0.053*** (0.011)	0.043*** (0.010)	0.020** (0.009)	0.005 (0.008)	0.035*** (0.010)	0.026*** (0.008)	0.036*** (0.010)	0.034*** (0.009)	0.001 (0.008)
Log (Employment)	0.127*** (0.005)	0.128*** (0.004)	0.075*** (0.004)	0.078*** (0.003)	0.007* (0.004)	-0.009** (0.004)	0.141*** (0.004)	0.128*** (0.004)	0.085*** (0.003)
Relative Productivity	0.254*** (0.021)	0.170*** (0.019)	0.169*** (0.019)	0.090*** (0.014)	0.039** (0.019)	0.027 (0.017)	0.238*** (0.018)	0.162*** (0.017)	0.132*** (0.015)
Existence of Plants Abroad	0.138*** (0.023)	0.262*** (0.021)	0.170*** (0.021)	0.299*** (0.016)	-0.052** (0.021)	-0.094*** (0.019)	0.259*** (0.020)	0.281*** (0.020)	0.252*** (0.016)
Location of Headquarters	-0.211*** (0.023)	0.006 (0.021)	-0.343*** (0.021)	-0.108*** (0.015)	-0.177*** (0.021)	-0.128*** (0.019)	-0.107*** (0.020)	0.005 (0.019)	-0.203*** (0.016)
Sales to Subsidiaries or Parent Company	-0.007 (0.039)	-0.061* (0.036)	0.022 (0.035)	-0.026 (0.026)	0.046 (0.035)	0.017 (0.031)	-0.052 (0.034)	-0.064* (0.033)	0.012 (0.028)
Reporting Cost of Financing as an Obstacle to Doing Business	0.043*** (0.016)	0.010 (0.015)	0.045*** (0.014)	0.012 (0.011)	0.015 (0.014)	0.010 (0.013)	0.030** (0.014)	0.022* (0.013)	0.023** (0.011)
Reporting Access to Financing as an Obstacle to Doing Business	-0.026* (0.015)	-0.005 (0.014)	-0.039*** (0.014)	-0.013 (0.010)	-0.018 (0.014)	-0.010 (0.012)	-0.012 (0.013)	-0.004 (0.013)	-0.025** (0.011)
Age	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)	0.000* (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Share of College Educated Labor	0.002*** (0.000)	0.000** (0.000)	0.003*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.002*** (0.000)
Research & Development Expenditure	0.012*** (0.002)	0.013*** (0.002)	0.003 (0.002)	0.003** (0.001)	0.012*** (0.002)	0.006*** (0.002)	0.010*** (0.002)	0.011*** (0.002)	-0.001 (0.002)
Use of External Audit	0.032** (0.013)	0.016 (0.011)	0.023** (0.011)	0.007 (0.008)	-0.001 (0.011)	-0.007 (0.010)	0.029*** (0.011)	0.020* (0.010)	0.020** (0.009)
ISO Certification	0.074*** (0.015)	0.096*** (0.013)	0.009 (0.013)	0.033*** (0.010)	0.003 (0.013)	-0.020* (0.012)	0.097*** (0.013)	0.102*** (0.012)	0.027*** (0.010)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Engagement in Trade	Exporting	Importing	Exporting & Importing	Use of Intermediaries	Trade Only Through Intermediaries	Direct Trade	Direct Exporting	Direct Importing
Share of State in Ownership	-0.075 (0.053)	-0.096* (0.049)	0.020 (0.047)	0.011 (0.036)	0.033 (0.047)	0.035 (0.042)	-0.078* (0.047)	-0.066 (0.045)	-0.013 (0.038)
Constant	-0.182*** (0.050)	-0.587*** (0.044)	0.212*** (0.044)	-0.224*** (0.032)	0.471*** (0.045)	0.466*** (0.040)	-0.596*** (0.043)	-0.621*** (0.040)	-0.218*** (0.034)
Observations	6,967	6,967	6,967	6,967	6,967	6,967	6,967	6,967	6,967
R-squared	0.332	0.335	0.301	0.308	0.099	0.085	0.403	0.367	0.354

(Table 5 Continued)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Effects of Foreign Ownership on Propensity to Engage in Trade by Country Groups (Means and [Bootstrapped] Standard Errors for [Post-Matching] Effects)

	Lower Middle Income (N=6,669: Foreign Owned 376, Domestic 6,293)					Upper Middle Income (N=2,575: Foreign Owned 229, Domestic 2,346)				
	Egypt, ElSalvador, Guatemala, Honduras, India, Morocco, Nicaragua, Philippines, Vietnam					Brazil, Chile, Ecuador, SouthAfrica				
	Foreign Owned	Domestic Before Matching	Effect Size Before Matching	Domestic After Matching	Effect Size After Matching	Foreign Owned	Domestic Before Matching	Effect Size Before Matching	Domestic After Matching	Effect Size After Matching
International Trade	0.875	0.304	0.571 (0.024)	0.704	0.171 (0.036)	0.799	0.467	0.333 (0.034)	0.731	0.068 (0.054)
Exporting	0.779	0.239	0.541 (0.023)	0.612	0.168 (0.050)	0.703	0.310	0.393 (0.032)	0.645	0.058 (0.046)
Importing	0.598	0.152	0.446 (0.020)	0.460	0.138 (0.049)	0.572	0.297	0.275 (0.032)	0.399	0.173 (0.062)
Exporting & Importing	0.503	0.087	0.416 (0.016)	0.368	0.135 (0.047)	0.476	0.141	0.335 (0.026)	0.313	0.163 (0.058)
Use of Intermediaries in Trade	0.128	0.108	0.020 (0.017)	0.157	-0.029 (0.045)	0.210	0.234	-0.024 (0.029)	0.191	0.019 (0.044)
Trade Through Intermediaries	0.045	0.074	-0.029 (0.014)	0.082	-0.036 (0.025)	0.057	0.173	-0.116 (0.026)	0.098	-0.041 (0.036)
Direct Trade	0.840	0.239	0.601 (0.022)	0.642	0.199 (0.041)	0.769	0.331	0.437 (0.033)	0.693	0.076 (0.055)
Direct Exporting	0.758	0.204	0.554 (0.021)	0.581	0.177 (0.021)	0.672	0.271	0.402 (0.031)	0.607	0.066 (0.063)
Direct Importing	0.574	0.107	0.467 (0.017)	0.408	0.167 (0.053)	0.537	0.158	0.379 (0.027)	0.335	0.202 (0.055)

Table 7: Effects of Access to External Finance on Engagement in Trade by Country Groups (Means and [Bootstrapped] Standard Errors for [Post-Matching] Effects)

	Lower Middle Income (N=6,669: Unconstrained 2,109; Constrained 4,560)					Upper Middle Income (N=2,575: Unconstrained 1,392; Constrained 1,183)				
	Egypt, ElSalvador, Guatemala, Honduras, India, Morocco, Nicaragua, Philippines, Vietnam					Brazil, Chile, Ecuador, SouthAfrica				
	Access to External Finance	Finance Constrained - Before Matching	Effect Size Before Matching	Finance Constrained After Matching	Effect Size After Matching	Access to External Finance	Finance Constrained - Before Matching	Effect Size Before Matching	Finance Constrained After Matching	Effect Size After Matching
International Trade	0.437	0.286	0.151 (0.012)	0.374	0.063 (0.021)	0.528	0.438	0.090 (0.020)	0.469	0.059 (0.028)
Exporting	0.348	0.230	0.117 (0.012)	0.296	0.051 (0.019)	0.357	0.276	0.081 (0.018)	0.305	0.052 (0.023)
Importing	0.225	0.152	0.072 (0.010)	0.161	0.064 (0.014)	0.350	0.303	0.047 (0.019)	0.318	0.032 (0.029)
Exporting & Importing	0.136	0.097	0.039 (0.008)	0.086	0.049 (0.014)	0.179	0.140	0.039 (0.015)	0.160	0.019 (0.022)
Use of Intermediaries in Trade	0.152	0.087	0.065 (0.008)	0.124	0.028 (0.017)	0.271	0.224	0.047 (0.017)	0.235	0.036 (0.028)
Trade Through Intermediaries	0.104	0.057	0.048 (0.007)	0.081	0.023 (0.011)	0.202	0.170	0.032 (0.015)	0.170	0.031 (0.021)
Direct Trade	0.349	0.236	0.113 (0.012)	0.300	0.049 (0.019)	0.374	0.294	0.080 (0.019)	0.327	0.047 (0.021)
Direct Exporting	0.299	0.204	0.095 (0.011)	0.259	0.039 (0.020)	0.321	0.237	0.084 (0.018)	0.273	0.048 (0.022)
Direct Importing	0.160	0.119	0.041 (0.009)	0.116	0.044 (0.014)	0.177	0.165	0.012 (0.015)	0.176	0.001 (0.022)

Table 8: Effects of Ability to Locate “Better” Clients on Engagement in Trade (Means and [Bootstrapped] Standard Errors for [Post-Matching] Effects)

	Middle Income Countries (N=9,384: Treated 2,476, Untreated 6,908)					
	Before Matching			After Matching (3-to-1 NN PS)		
	Large Domestic Partners	No Large Domestic Partners	Effect Size	Large Domestic Partners	No Large Domestic Partners	Effect Size
International Trade	0.525	0.331	0.194 (0.011)	0.525	0.471	0.054 (0.019)
Exporting	0.342	0.265	0.076 (0.010)	0.342	0.346	-0.004 (0.016)
Importing	0.401	0.160	0.240 (0.009)	0.401	0.314	0.086 (0.017)
Exporting & Importing	0.218	0.095	0.122 (0.007)	0.218	0.190	0.027 (0.017)
Use of Intermediaries in Trade	0.253	0.110	0.143 (0.008)	0.253	0.178	0.075 (0.012)
Trade Through Intermediaries	0.174	0.078	0.096 (0.007)	0.174	0.124	0.049 (0.013)
Direct Trade	0.390	0.261	0.128 (0.010)	0.390	0.375	0.014 (0.017)
Direct Exporting	0.279	0.226	0.053 (0.009)	0.279	0.304	-0.025 (0.015)
Direct Importing	0.233	0.105	0.128 (0.007)	0.233	0.204	0.029 (0.015)
Middle Income Countries (N=9,244: Treated 984, Untreated 8,400)						
	Before Matching			After Matching (3-to-1 NN PS)		
	MNC Partners	No MNC Partners	Effect Size	MNC Partners	No MNC Partners	Effect Size
International Trade	0.600	0.356	0.244 (0.016)	0.600	0.514	0.085 (0.029)
Exporting	0.406	0.271	0.134 (0.015)	0.406	0.386	0.019 (0.025)
Importing	0.468	0.195	0.273 (0.013)	0.468	0.348	0.119 (0.023)
Exporting & Importing	0.274	0.110	0.163 (0.011)	0.274	0.220	0.054 (0.020)
Use of Intermediaries in Trade	0.320	0.128	0.191 (0.011)	0.320	0.222	0.097 (0.026)
Trade Through Intermediaries	0.200	0.092	0.107 (0.010)	0.200	0.144	0.055 (0.023)
Direct Trade	0.454	0.276	0.177 (0.015)	0.454	0.408	0.046 (0.024)
Direct Exporting	0.337	0.229	0.108 (0.014)	0.337	0.332	0.005 (0.022)
Direct Importing	0.263	0.124	0.139 (0.011)	0.263	0.213	0.049 (0.023)

Table 9: Effects of Access to Better Clients on Engagement in Trade by Country Groups (Means and [Bootstrapped] Standard Errors for [Post-Matching] Effects)

	Lower Middle Income (N=6,669: Treated 1,346; Untreated 5,323)					Upper Middle Income (N=2,302: Treated 1,055; Untreated 1,247)				
	Egypt, ElSalvador, Guatemala, Honduras, India, Morocco, Nicaragua, Philippines, Vietnam					Brazil, Chile, Ecuador, SouthAfrica				
	Large Domestic Partners	No Large Domestic Partners Before Matching	Effect Size Before Matching	No Large Domestic Partners After Matching	Effect Size After Matching	Large Domestic Partners	No Large Domestic Partners Before Matching	Effect Size Before Matching	No Large Domestic Partners After Matching	Effect Size After Matching
International Trade	0.433	0.308	0.124 (0.014)	0.361	0.072 (0.020)	0.622	0.411	0.211 (0.020)	0.569	0.052 (0.037)
Exporting	0.277	0.264	0.013 (0.013)	0.287	-0.009 (0.025)	0.406	0.249	0.157 (0.019)	0.403	0.002 (0.028)
Importing	0.307	0.141	0.165 (0.011)	0.205	0.101 (0.021)	0.502	0.252	0.249 (0.019)	0.370	0.132 (0.033)
Exporting & Importing	0.152	0.098	0.054 (0.009)	0.132	0.019 (0.018)	0.286	0.090	0.195 (0.015)	0.204	0.082 (0.026)
Use of Intermediaries in Trade	0.193	0.086	0.106 (0.009)	0.114	0.078 (0.019)	0.329	0.217	0.112 (0.018)	0.262	0.067 (0.027)
Trade Through Intermediaries	0.140	0.054	0.086 (0.007)	0.067	0.073 (0.014)	0.222	0.185	0.037 (0.016)	0.200	0.022 (0.024)
Direct Trade	0.316	0.260	0.056 (0.013)	0.302	0.014 (0.025)	0.460	0.253	0.207 (0.019)	0.438	0.021 (0.031)
Direct Exporting	0.222	0.236	-0.014 (0.012)	0.263	-0.041 (0.021)	0.375	0.211	0.163 (0.018)	0.367	0.008 (0.025)
Direct Importing	0.206	0.113	0.093 (0.010)	0.161	0.044 (0.021)	0.300	0.099	0.201 (0.015)	0.204	0.096 (0.034)

(Table 9 continued)

	Lower Middle Income (N=6,669: Treated 432; Untreated 6,237)					Upper Middle Income (N=2,302: Treated 515; Untreated 1,787)				
	Egypt, ElSalvador, Guatemala, Honduras, India, Morocco, Nicaragua, Philippines, Vietnam					Brazil, Chile, Ecuador, SouthAfrica				
	MNC Partners	No MNC Partners Before Matching	Effect Size Before Matching	No MNC Partners After Matching	Effect Size After Matching	MNC Partners	No MNC Partners Before Matching	Effect Size Before Matching	No MNC Partners After Matching	Effect Size After Matching
International Trade	0.493	0.322	0.170 (0.023)	0.379	0.113 (0.039)	0.669	0.461	0.208 (0.024)	0.622	0.047 (0.032)
Exporting	0.328	0.263	0.065 (0.022)	0.297	0.031 (0.042)	0.452	0.283	0.168 (0.023)	0.450	0.001 (0.031)
Importing	0.340	0.163	0.176 (0.018)	0.209	0.130 (0.036)	0.555	0.312	0.242 (0.023)	0.434	0.120 (0.038)
Exporting & Importing	0.175	0.104	0.071 (0.015)	0.127	0.048 (0.030)	0.337	0.134	0.203 (0.018)	0.263	0.074 (0.034)
Use of Intermediaries in Trade	0.243	0.098	0.144 (0.015)	0.120	0.122 (0.031)	0.392	0.233	0.158 (0.021)	0.273	0.119 (0.048)
Trade Through Intermediaries	0.168	0.064	0.104 (0.012)	0.066	0.102 (0.028)	0.233	0.193	0.039 (0.020)	0.204	0.028 (0.032)
Direct Trade	0.351	0.265	0.085 (0.022)	0.329	0.022 (0.036)	0.514	0.300	0.214 (0.023)	0.483	0.031 (0.039)
Direct Exporting	0.253	0.222	0.030 (0.020)	0.254	-0.001 (0.035)	0.384	0.240	0.144 (0.021)	0.396	-0.011 (0.038)
Direct Importing	0.198	0.121	0.077 (0.016)	0.160	0.038 (0.023)	0.294	0.135	0.159 (0.017)	0.245	0.049 (0.030)