Firms' exporting, employment and wages: evidence from Chile

Andrea Pellandra

May 2013

Abstract

This paper uses plant-level microdata from the Chilean National Manufacturing survey matched with administrative customs records for the period 1995-2007 to investigate the impact of starting to export on the dynamics of employment and wages of skilled and unskilled labor at the firm level. I develop a model of international trade with two dimensions of firm heterogeneity and sorting across destinations that predicts that trade liberalization should increase demand for unskilled labor and average wages of skilled labor through an upgrading in the skill composition, and that these effects are increasing in the income of destination countries. Using matched sampling techniques to control for self selection, I find that firms that start exporting increase their employment of low-skilled workers on average by 12%, but that exporting has no statistically significant effect on average low-skilled wages. On the other hand, exporting has on average a 10% positive effect on high-skill wages, and as predicted by the theoretical model, skill upgrading is stronger for firms exporting to high-income destinations. These results are qualitatively confirmed using a triple difference estimator which compares firms experiencing above versus below-median tariff reductions during Chile's trade liberalization between 1996 and 2007, highlighting an important mechanism that may have contributed to the persistence of high levels of income inequality in the country.

1 Introduction

Since the last decade, there has been a growing debate on the impact of globalization on the labor markets in Latin America, and one of the topics that have drawn most attention is how changes in the productive structure due to trade liberalization have affected the labor markets in the region. Indeed, there are concerns that the changes in the productive structure due to Latin American countries' increasing trade orientation could have affected the quality and quantity of employment and wage inequality. Recent work in international trade that has reoriented the focus of analysis on the heterogeneity among individual plants and firms has stressed the importance of differences in the type of workers firms employ, and of compositional changes in reponse to trade liberalization that may induce reallocation of labor towards "higher quality" firms. As pointed out by Goldberg and Pavnick (2007) in their excellent review on globalization and inequality, what is essential for establishing a connection between compositional changes within an industry and the inequality debate is that high quality firms have a higher demand for skill, so that quality upgrading leads to an increase in the skill premium. If production for export markets is relatively more skill-intensive than production for developing countries' domestic markets, an increase in exports will increase the relative demand for skilled workers within industries and lead to a higher skill premium. In this paper, I develop a model that describes a mechanism through which trade liberalization may lead to a skill upgrading within firms, and I use plant level data from the Chilean National Manufacturing Survey for the period 1995-2007 matched with administrative customs data to test the model's predictions.

In the past two decades, Chile experienced an exceptional period of sustained economic growth, which led to a more than doubling of its income per capita, and to a reduction of its poverty rate to less than a third of the 1990 level. These advances were achieved concurrently to four continuous decades of free trade policies that have consolidated the position of Chile as one of the world's most open economies. After the far reaching reforms that liberalized trade in the mid seventies which dramatically altered the trade composition and the productive structure of the economy, in the nineties Chile moved to a new trade liberalization strategy founded upon the negotiation of bilateral trade agreements. Today, Chile has signed 22 trade agreements with 60 countries, including the United States, the European Union, and China, and more than 93% of its exports are covered by trade preferences. Most of these trade agreements entered into force in the late 90s and early 2000s: table 1 below presents the trade agreements entered into force between 1995 and 2007, with the percentage of Chilean exports covered by each partner in the year it came into effect. In the same time span, total exports increased fourfold, and manufacturing exports followed a similar pattern (see figure 1), representing roughly one third of the total throughout the period. Therefore, the data used in this study covers a period characterized by intense trade negotiations in pursuit of foreign market access, and can therefore provide a useful environment to analyze the effects of exporting on labor market outcomes at the plant level.

In spite of its macroeconomic success, income inequality in Chile – the highest in South America – has persisted at unacceptably high levels, creating the perception of social exclusion for many segments of the population, which have for the most part felt unaffected by the economic boom. In fact, the country – as its economy - is becoming more and more partitioned in two: the social groups and geographical areas linked to the modern segment of the economy, highly competitive, productive and inserted in the world markets, experience growing employment and consumption, while the economic segment of medium and low productivity, isolated from the process of globalization and which include the bulk of informal and temporary employment, creates scarce opportunities for the social groups and geographical areas linked to it. Figure 2 shows the evolution of two well-known measures of wage inequality (the Gini coefficient and the 90-10 decile income ratio) in the same time period covered by this study. The figures are particularly striking given that this period was characterized by an extraordinary expansion in public spending for public services, housing and social security aimed at the poorest strata of the population, which to some extent was able to attenuate the social effects of this diverging dynamics.

It is well known in the literature and it is also the case in Chile (Alvarez and Lopez (2005)) that exporting firms are larger in number of employees and sales; they are more productive and pay higher wages than non-exporting ones. However, it is clear that exporting is not randomly assigned but is a choice variable of the firm, which makes estimating causal effects on labor market variables within the firm difficult. In order to deal with this problem, I use a difference-in-difference approach combined with a propensity score matching methodology to control for self selection into exporting. The treatment group refers to new exporters, that is plants that were originally not exporters in the first year they are observed in the sample but started to export in any subsequent year, and the control group is composed of plants that never exported. I construct a sample of treatments and controls with similar observable characteristics before treatment, and use the sample of matched plants to perform non parametric difference-in-difference estimations to capture the effects on the plant's labor related variables after beginning to export. The difference-in-difference estimations allow me to control for time invariant unobservable factors affecting the outcome variables. I repeat the procedure for plants only exporting to the Latin American market and for plants exporting also to high income destinations to determine whether the impact of exporting has any relationship with the level of sophistication of the destination markets. Among other papers that have used the propensity score matching technique with plant-level data, the most related to this study are De Loecker (2007), who analyzes the productivity effects of starting to export using data for Slovenian manufacturing firms, and Huttunen (2007), Arnold and Javorcik (2009) and Girma and Gorg

(2007), who analyze the impact of foreign acquisition on wages and employment at the plant level in Finland, Indonesia, and the U.K., respectively[1].

My results are quite novel compared with the literature. I find that starting to export leads to an increase in employment of low-skilled workers but has no statistically significant effect on the employment of high-skilled workers. On the other hand, I find no effect on plant average low-skill wages but a significant positive effect on high-skill average wages. When starting to export, firms expand sales and increase the demand for low-skill workers who seem to be available with a somewhat perfectly elastic labor supply curve as their wages within plants do not change. Overall labor demand for high-skill workers remains the same, but high-skilled workers seem to be paid more on average when the firms start to export. My interpretation for this result is that higher average wages may be a proxy for higher quality workers, so that firms may be upgrading skills contemporaneously to beginning to export.

This paper is structured as follows. The next section discusses the recent theoretical and empirical literature on the subject. Section 3 presents a theoretical model of firm's sorting into different export destinations and demand for skills. Section 4 presents the data and the empirical strategy, while Section 5 discusses the methodological approach and presents the results of the effects of export entry on labor market outcomes. Section 6 concludes.

2 Literature review

The relationship between trade liberalization, employment, and wage inequality has received a great deal of attention in the international trade and labor economics literature in the past years. Following the introduction of models examining the role of firm heterogeneity in international trade (Melitz (2003)), a new body of literature has started to explore the labor market implications in the context of heterogeneous firms and heterogeneous workers. In the Melitz's model, due to the assumption of homogeneous labor and a perfect and frictionless labor market, the wages paid by a firm are disconnected from the firm's performance, and all workers are employed for a common wage

[1] Additional studies that used the PSM methodology with plant level data for manufacturing include Serti and Tomassi (2008), who study the impact of starting to export on productivity for Italian manufacturing firms, Fryges and Wagner (2010), who apply a continuous treatment approach to deal with the same question using German manufacturing data, Gorg, Hanley and Stroebl (2008), who analyze the effect of government grants on exporting for Irish firms using a multiple treatment propensity score method, and Chen (2010), who studies the casual relationship between origin country of FDI and the performance of acquired firms in the United States.

and affected simultaneously by the opening of trade. However, the Melitz model was importantly extended by Yeaple (2005), Bernard, Redding and Schott (2007), and Bustos (2010) to allow more interesting implications of trade on the labor market. Bernard, Redding and Schott's model embeds heterogeneous firms in a neoclassical model of comparative advantage and predicts that reductions in trade barriers result in net job creation in the comparative advantage industry and net job destruction in the comparative disadvantage industry, in line with standard Heckscher-Olin predictions. However, in their model there is simultaneous gross job creation and destruction in both industries, a feature that was absent in the original Heckscher-Ohlin model: in both industries, there is gross job creation at high-productivity firms that expand to serve the export market combined with simultaneous gross job destruction at surviving firms that produce just for the domestic market. Bustos (2010) assumes that after learning its productivity, the firm can choose an advanced technology H or a traditional technology L. The advanced technology requires higher fixed costs, but affords lower variable costs, so lower productivity firms only use technology L to serve the domestic market, intermediate productivity firms use technology L to serve the domestic market and export, and higher productivity firms use the most advanced technology H to serve the domestic market and export. With trade liberalization, the reduction in trading costs raises operating profits for all exporters, but proportionally more for those who use the advanced technology if an exporter's productivity is close to the high technology cutoff. As the cutoffs decline, similarly as in the Melitz's model, some domestic firms begin to export, and lower productivity exporters switch to the better technology. Bustos also examines skill upgrading, which is complementary to the upgrading in technology, and finds using data for Argentina that of the 17 percent rise in the demand for skilled workers after trade liberalization in the nineties, 15% took place within firms. Her empirical analysis confirms Yeaple (2005)'s model prediction that a reduction in trade frictions can induce firms to switch technologies, leading to an expansion of trade volumes, an increase in the wage premium paid to the most highly skilled workers and a decrease in the wage premium paid to moderately skilled workers.

The link between trade and wages with heterogeneous firms is also empiricaly examined by Verhoogen (2008), who exploits the 1994 peso crisis as an exogenous source of variation in Mexican firms' export activity. He finds that the exchange rate devaluation led more productive plants to increase exports, with some indication that they shifted their product mix towards higher quality varieties to appeal to U.S. consumers. This upgrade in quality led to an increase in the relative wage of white collar workers as compared to less productive plants within the same industry, thereby contributing to the increase in wage inequality experienced by Mexico in the 90s. Another paper that links quality upgrading with firms' skill utilization and wages is a recent work by Brambilla, Lederman and Porto (2012). In their model, they posit two different ways in which exporting, and exporting to high-income destinations in particular, may increase the demand for skills. The first is a quality upgrading argument (the "shipping the good apples out" story) in which skilled labor is needed to produce higher quality products demanded by foreign consumers; the skill utilization may additionally vary by export destination as a consequence of differences in transport costs between high-income and neighboring markets. The second is a "skilled-bias globalization" reason, by which international trade activities require the utilization of resources that are intensive in skilled labor. The skill intensity of these activities, which are unrelated with product quality, may also be increasing in export destination countries' income. Using a panel of Argentinian manufacturing firms, they exploit the exogenous changes in exports and export destinations triggered by the currency devaluation experienced by Brazil, one of the Argentina's main trade partners, to identify the effects of exporting – and exporting to high-income destinations in particular – on skill utilization. While they do not find any causal effect of exporting in general on skill utilization, exporters to high income destinations do hire a higher proportion of skilled workers (and pay higher average wages) than domestic firms.

Another set of studies posits two additional mechanisms by which trade liberalization can contribute to increasing wage inequality within firms. Amiti and Davis (2012) assume a fair wage constraint by which firms earning positive profits pay wages to observationally identical workers that are increasing in firms' profitability and are necessary to elicit effort. Subject to this constraint, firms determine the mode of globalization (exporting final goods, importing intermediates, or both) that maximizes profits, and this choice also uniquely identifies wage and all other firm level variables. Therefore, their model predicts that a move from autarky to costly trade would lead to a decline in wages at firms that only sell domestically and at marginal importers and exporters, and a rise in wages at larger exporters and importers, and using data from the Indonesian manufacturing census they find support for the model's prediction. In contrast, Helpman, Itskhoki and Redding (2010) develop a model with worker heterogeneity, heterogeneous screening costs and endogenous sorting of workers across firms according to unobserved worker characteristics to explain the presence of within firm wage inequality. While workers are ex ante homogeneous, they draw a match-specific ability when matched with a firm, which is not directly observed by either the firm or the worker. Firms, however, can invest resources in screening their workers to obtain information about ability. Due to the presence of "screening frictions", they experience a trade off between a potential increase in output from raising average worker ability and the costs incurred by screening workers. In equilibrium, larger, more productive firms screen workers more intensively to a higher ability threshold, and as a result employ workers with a higher average ability and pay higher wages. These differences in firm characteristics are systematically related to export participation: exporters are larger and more productive than nonexporters; they screen workers more intensively; and they pay higher wages in comparison to firms with similar productivity that do not export. This framework highlights a new mechanism through which trade affects inequality, based on variation in workers' quality and wages across firms, and the participation of only the most-productive firms in exporting. Consistently with this model, Krishna et al. (2011), using a detailed matched employer-employee dataset from Brazil, find that declines in trade barriers are associated with wage increases in exporting firms, and that such increases are predominantly driven by the improvement in the workforce composition in exporting firms in terms of worker-firm matches.

3 A model of exporting with heterogeneous productivity and sorting across destinations

This section develops the theoretical model, which is an extension of the Melitz (2003) model with one Chamberlinian monopolistic competitive industry and a continuum of heterogeneous firms supplying a horizontally differentiated good under increasing returns to scale internal to the firm as in Krugman (1979).

3.1 Consumer Demand

The economy is assumed to be able to produce a very large number of varieties of the differentiated good, where each variety is ordered from 1 to n and indexed with i. Each household shares the same preferences given by the following C.E.S. utility function in which all varieties of the good enter symmetrically:

$$U = \left[\sum_{i=1}^{n} x_i^{\rho} \right]^{\frac{1}{\rho}} \tag{1}$$

where x^i is the amount of consumption of the i-th variety and $0 < \rho < 1$ is a constant preference parameter, implying an elasticity of substitution between any two varieties of $\sigma = \frac{1}{1-\rho} > 1$. Consumer behavior can be represented as in Dixit and Stiglitz (1977)considering the set of consumed varieties as an aggregate good Q, associated with an aggregate price P. Subject to the a budget constraint of $\sum_{i=1}^{n} x_i p_i$, where income Y and prices are given, the household will choose the quantity of each variety x_i which maximizes U, thereby generating a demand function[2]:

$$x_i = E \left[\frac{p_i}{P} \right]^{-\sigma} \tag{2}$$

where E is the aggregate level of real income (and therefore consumption) in the country.

3.2 Technology and firms' optimal choices

Each variety is produced by one firm, and technology is represented by a Cobb-Douglas production function with three factors of production - unskilled labor, skilled labor, and capital -, and a firm-specific productivity index φ:

$$q = f(l, h, \bar{k}, \varphi) = \varphi h^{\alpha} l^{1-\alpha} \bar{k}^{\beta} \tag{3}$$

The production of a good to be provided to consumers can be thought of as combining two sets of tasks: manufacturing and services. Manufacturing utilizes frontline unskilled production workers l, skilled specialized workers h such as shift supervisors and automatized machinery technicians, and capital, while services (such as R&D, marketing, distribution, and customer support) only utilize skilled white collar labor. Manufacturing labor costs vary linearly with output ($0 < \alpha < 1$), and the relative importance of the two factors of production depends on the size of the parameter α, and capital depends on previous years' investment so it is considered fixed in the short run. Service costs are also fixed, and have to be borne every period independently on volume. Cost minimization requires that the ratio of the variable inputs' prices $\frac{w}{v}$ equals the marginal rate of technical substitution, which, since the production function is homothetic, depends only on the

[2]The derivation of the demand curve is presented in Appendix 1

ratio of the two inputs:

$$\frac{w}{v} = RTS = \frac{MP_l}{MP_h} = \frac{1-\alpha}{\alpha}\frac{h}{l} \tag{4}$$

Solving for h and l, I can substitute back in the production function to obtain the contingent labor demand at the firm level:

$$l^D = (1-\alpha)\, A\frac{q}{\varphi}\left(\frac{v}{w}\right)^{\alpha}\bar{k}^{\beta} \tag{5}$$

$$h^D = \alpha A\frac{q}{\varphi}\left(\frac{v}{w}\right)^{\alpha-1}\bar{k}^{\beta} \tag{6}$$

where $A = \frac{(1-\alpha)^{\alpha-1}}{\alpha^{\alpha}}$ is a constant that only depends on the parameter α. Substituting in the total variable cost function obtains:

$$TC(w,v,q) = wl + vh = A\frac{q}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta} \tag{7}$$

and (constant) marginal costs are:

$$MC = \frac{\partial TC}{\partial q} = \frac{A}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta} \tag{8}$$

The profit-maximizing condition is to set marginal revenue equal to marginal cost. Since each firm faces a residual demand curve with constant elasticity $-\sigma$, the profit-maximizing markup equals $\frac{1}{\sigma}$, the negative of the inverse of elasticity of demand for each firm regardless of its productivity. The common equilibrium price for each produced variety is therefore:

$$p_i = \frac{MC}{1-\frac{1}{\sigma}} = \frac{MC}{\rho} = \frac{A}{\varphi\rho}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta} \tag{9}$$

which gives a total revenue of:

$$TR = EP^{\sigma}\left(\frac{\varphi\rho}{A}\right)^{\sigma-1}\left(v^{\alpha}w^{1-\alpha}\right)^{1-\sigma}\bar{k}^{\beta(1-\sigma)} \tag{10}$$

and operating profits of:

$$\pi(\varphi) = \frac{EP^{\sigma}\left(\frac{\varphi\rho}{A}\right)^{\sigma-1}\left(v^{\alpha}w^{1-\alpha}\right)^{1-\sigma}\bar{k}^{\beta(1-\sigma)}}{\sigma} \tag{11}$$

3.3 Entry and industry equilibrium in the closed economy

In order to enter the market, a firm has to pay a non-recoverable fixed capital cost of entry cf_e. Each firm discovers its productivity φ - drawn from a continuous cumulative distribution function $G(\varphi)$ – only after making the initial investment and upon entering the market, and after observing its productivity[3] it decides whether to exit or remain in the market and produce. If a firm stays in the market, it faces in every period a constant probability δ of an adverse productivity shock that would then force it to exit. Therefore, a firm will only produce if its variable profit can cover the short-run services fixed cost $a_1\bar{h}_s$:

$$\pi_D(\varphi) = \varphi^{\sigma-1}B - a_1\bar{h}_s > 0 \tag{12}$$

where a_1 is the price of service labor and $B = \sigma^{-1}EP^{\sigma}\left(\frac{\rho}{A}\right)^{\sigma-1}\left(v^{\alpha}w^{1-\alpha}\right)^{1-\sigma}\bar{k}^{\beta(1-\sigma)}$. I can therefore define a cutoff productivity level:

$$\varphi_D^* = \left[\frac{a_1\bar{h}_s}{B}\right]^{\frac{1}{\sigma-1}} \tag{13}$$

, the lowest productivity level at which firms will produce in the domestic market, as the one satisfying the condition $\pi_D(\varphi^*) = 0$. In figure 3, firms with productivity levels below the cutoff φ_D^* do not produce, because operating profits do not cover fixed costs, while firms with productivity above the cutoff remain in the market.

3.4 Exporting behavior

Let's now assume that firms can also export their product to another country in Latin America, which has a demand function facing each firm:

$$x_i = E^{LAC}\left[\frac{p_i}{P}\right]^{-\sigma} \tag{14}$$

which depends on a function of the relative price of each variety that has the same elasticity as in the domestic market, and on the income level of the destination country which is assumed to be

[3]As indicated in Melitz (2003), productivity differences may reflect cost differences (the ability to produce output using fewer variable inputs) as well as different valuations of the good by customers.

identical to the home country ($E = E^{LAC)4}$. Exporting firms face melting iceberg variable trade costs (typically including transport costs, tariffs and other duties) for the shipment of each unit of the product, so that τ units need to be shipped for one unit to reach its destination. Additionally, firms wishing to export also need to incur additional service costs $a_2\overline{h}_s$ to adapt the product to the foreign country that do not vary with export value[5] and as in the domestic case are assumed to utilize only skilled labor. The price of skilled service labor needed by firms exporting to Latin American destinations is $a_2 > a_1$: this parameter can be thought of as an indicator of labor quality, so firms that wish to export need to change their labor composition towards a higher quality mix, replacing existing workers with better quality workers such as highly skilled product designers or research scientists.

After the firm pays the initial entry costs, at the same time as it gains knowledge of its productivity φ it also observes another parameter, "export ability" η, randomly drawn from a different distribution $G(\eta)$. This additional source of heterogeneity can be thought of as the ability to adapt product quality and provide additional services necessary for the export market with fewer fixed costs. Therefore, in addition to productivity φ, which solely determines the choice to produce for the domestic market, the decision of whether to export also depends on an other parameter which is heterogeneous across firms. Therefore, firms with productivity higher than the domestic cutoff can make additional profits serving another Latin American market if[6]:

$$\pi_X^{lac}(\varphi, \eta) = \left(\frac{\varphi}{\tau}\right)^{\sigma-1} B - \frac{a_2\overline{h}_s}{\eta} > 0 \tag{15}$$

where B is defined as above. Since profits depend on two variables, by imposing $\pi_X^{lac}(\varphi^*, \eta) = 0$ I

[4]This assumption mirrors Melitz's set up of a world comprised of a number of identical countries. For the case of Chile and Latin America, this is for the most part a quite realistic hypothesis.

[5]"A firm must find and inform foreign buyers about its product and learn about the foreign market. It must then research the foreign regulatory environment and adapt its product to ensure that it conforms to foreign standards (which include testing, packaging and labeling requirements). An exporting firm must also set up new distribution channels in the foreign country and conform to all the shipping rules specified by the foreign customs agency. [...] Regardless of their origin, these costs are most appropriately modeled as independent of the firm's export volume decision". (Melitz, 2003)

[6]Firms choosing to export face a higher marginal cost $\frac{\tau A}{\varphi} w^{1-\alpha} v^{\alpha} \bar{k}^{\beta}$, and will therefore charge a higher price in the foreign market $\frac{\tau A}{\varphi\rho} w^{1-\alpha} v^{\alpha} \bar{k}^{\beta}$

can define an export cut-off *function* as:

$$\varphi_X^{*lac}(\eta) = \tau \left[\frac{a_2 \overline{h}_s}{\eta B} \right]^{\frac{1}{\sigma-1}} \tag{16}$$

By substituting the zero profit condition for the marginal firm (equation 13) in the equation above, I can express the export entry cut-off as a function of φ_D^*:

$$\varphi_X^{*lac}(\eta) = \varphi_D^* \tau \left[\frac{a_2 \overline{h}_s}{a_1 \overline{h}_s \eta} \right]^{\frac{1}{\sigma-1}} \tag{17}$$

Figure 3 depicts the iso-profit curve $\varphi_X^{*lac}(\eta)$which determines the exporting cutoff for the Latin American case: firms with any combination of (φ, η) earn zero profits from entering the export market, so all firms above the curve will export. What is especially noteworthy is that these curves are iso-profit curves but not iso-revenue curves: firms with low productivity but high export ability need lower revenues to cover their fixed cost, so revenue decreases along the curve. The two dimensions of firm heterogeneity break the direct relationship between productivity, size, and export status present in the Melitz model: low productivity firms are still smaller but they can compensate for their low productivity with high export ability and can still export. Note that the condition $\tau^{\sigma-1} \frac{a_2 \overline{h}_s}{\eta} > a_1 \overline{h}_s$ must be verified in order to maintain the familiar partitioning of firms by export status: however, the exact location of the export productivity cutoff will be different for each firm depending of its specific value of η.

Assume now that firms have the additional option to export their product to any other high-income country outside Latin America[7], which has a demand function facing each firm:

$$x_i = E^{HI} \left[\frac{p_i}{P} \right]^{-\sigma} \tag{18}$$

which also depends on a function of the relative price of each variety that has the same elasticity as in the domestic market, and on the income level of the destination country which in this case is assumed to be larger than the home country by a factor λ ($\lambda E = E^{HI}$). In addition to per-unit trading costs $\tau^{hi} > \tau$, firms wishing to export also need to incur additional service costs $a_3 \overline{h}_s$

[7]In the case of Chile the assumption that destination countries outside Latin America coincide with high-income countries is very plausible, since the only relevant low-income destination outside the region is China, and exports to this country were still quite limited in the period under analysis.

that do not vary with export value and as in the previous cases are assumed to utilize only skilled labor. However, service costs are assumed to vary according to the destination: exporting to high income destinations requires services in terms of higher product quality and design, and knowledge of the more advanced markets – including differences in social norms that determine how business is conducted, more stringent rules of laws, and the knowledge of foreign languages - that are more costly than services needed to supply the domestic and local Latin American market. Therefore, I assume that $a_3 > a_2$. Firms can make additional profits serving a high income market if :

$$\pi_X^{hi}(\varphi, \eta) = \left(\frac{\varphi}{\tau^{hi}}\right)^{\sigma-1} \lambda B - \frac{a_3 \overline{h}_s}{\eta} > 0 \tag{19}$$

where B is defined as above. By imposing $\pi_X^{hi}(\varphi^*, \eta) = 0$ he high income destinations export cut-off *function* can be defined as:

$$\varphi_X^{*hi}(\eta) = \tau^{hi} \left[\frac{a_3 \overline{h}_s}{\eta \lambda B}\right]^{\frac{1}{\sigma-1}} \tag{20}$$

and substituting the zero profit condition for the marginal firm in the equation above, I obtain the export entry cut-off as a function of φ_D^*:

$$\varphi_X^{*hi}(\eta) = \varphi_D^* \tau^{hi} \left[\frac{a_3 \overline{h}_s}{a_1 \overline{h}_s \eta \lambda}\right]^{\frac{1}{\sigma-1}} \tag{21}$$

Figure 3 depicts the iso-profit curve $\varphi_X^{*hi}(\eta)$ which determines the exporting cutoff for the high income destinations case: firms with any combination of (φ, η) earn zero profits from entering the high income export market, so all firms above the curve will export to a high income country. Note that $\left[\frac{\tau^{hi}}{\tau}\right]^{\sigma-1} \frac{a_3 \overline{h}_s}{\lambda} > a_2 \overline{h}_s$ must be satisfied for the high income cutoff curve to lie above the Latin American export cut-off curve for all combinations of (φ, η), which will be verified if the bigger size of the market cannot compensate for the additional fixed costs and variable transport costs. As long as $(\tau^{hi})^{\sigma-1} \frac{a_3 \overline{h}_s}{\eta \lambda} > a_1 \overline{h}_s$ is also verified, the model would therefore predict a well-determined sorting pattern with different productivity cutoffs across destinations. As in the previous case, the productivity cutoffs will be different for each firm depending on their firm-specific export ability η[8]. This is therefore the first empirically testable prediction of the model: at each productivity

[8] As noted earlier, in the static version of the model described so far, the domestic production cutoff only depends on the productivity parameter φ, while the export ability draw η only affects the export cutoffs and the number of firms that export. However, in the dynamic version of the model, there is a constant turnover of firms, and the

level above the minimum necessary to produce at all in the market, there will be a proportion of firms only operating domestically, a proportion exporting to Latin America only, and a proportion selling to high income destinations as well, and the percentage of exporters to each destination is increasing the higher the productivity draw.

3.5 Trade liberalization

Let's now consider a bilateral trade liberalization that reduces variable trading costs τ by the same proportion in all countries. As pictured in figure 4, this increases the return to exporting, which shifts the profit curves to the left and reduces the productivity cutoffs to $\varphi_x'^{*lac}(\eta)$ and $\varphi_x'^{*hi}(\eta)$. As a result, some firms above the domestic cutoff φ_D^* that were previously serving only the domestic market now find it profitable to start exporting to Latin American destinations (firms located in area A of figure 4), other firms with higher export ability can now make money serving both the Latin American and high income destination markets (firms located in area B of figure 4), while some previous exporters to Latin American destinations will now start exporting to high-income countries (firms located in area C of figure 4). With regard to labor market effects, I posit the following:

Prediction 1: Conditional on productivity (and therefore size), exporters will hire more skilled labor and/or pay higher skilled wages than non-exporters. This follows directly from an examination of figure 3. For each level of φ, firms with a higher export ability η will be able to cross the cut-off and will need to upgrade skills in order to export. This result is qualitatively different from the standard prediction that exporters pay wage premia over non-exporters.

Prediction 2: A reduction in variable trading costs will cause new exporters to expand and increase demand for unkskilled and skilled production labor. Demand for labor at the firm level can be obtained using Sheperd's lemma, ie. by differentiating the total variable cost function with respect to labor prices. Labor demand for firms only serving the domestic market has already been obtained in equations (5) and (6) above. For firms exporting to Latin American

increase in the expected present value of profits brought about by a higher numer of exporters will induce a larger number of firms to enter the market, which will cut into the profits of domestic producers and increase the domestic cutoff. Therefore, in the dynamic version of the model, the cumulative distribution of η, by affecting the number of firms that export, will also affect the domestic cutoff.

destinations only, total variable costs are:

$$TC(w,v,q_d,q_x^{lac}) = A\frac{q_d}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta} + A\frac{q_x^{lac}}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta}\tau \tag{22}$$

where $q_x^{lac} = \tau^{-\sigma}q_d$ (from equation (2) above). Using Shepard's lemma and substituting equations (5) and (6), labor demand for exporters to Latin America can be written as:

$$l_{lac}^D = \frac{\partial TC}{\partial w} = l^D(1+\tau^{1-\sigma}) \tag{23}$$

$$h_{lac}^D = \frac{\partial TC}{\partial v} = h^D(1+\tau^{1-\sigma}) \tag{24}$$

Total variable costs for exporters to Latin America and high income destinations are:

$$TC(w,v,q_d,q_x^{lac}) = A\frac{q_d}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta} + A\frac{q_x^{lac}}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta}\tau + A\frac{q_x^{hi}}{\varphi}w^{1-\alpha}v^{\alpha}\bar{k}^{\beta}\tau^{hi} \tag{25}$$

where $q_x^{hi} = \lambda(\tau^{hi})^{-\sigma}q_d$ (from equation (2) above). Using Shepard's lemma and substituting equations (5) and (6), labor demand for exporters to Latin America can be written as:

$$l_{hi}^D = \frac{\partial TC}{\partial w} = l^D\left[1+\tau^{1-\sigma}+\lambda(\tau^{hi})^{1-\sigma}\right] \tag{26}$$

$$h_{hi}^D = \frac{\partial TC}{\partial v} = h^D\left[1+\tau^{1-\sigma}+\lambda(\tau^{hi})^{1-\sigma}\right] \tag{27}$$

It then follows from (23) and (26) that $l_{hi}^D > l_{lac}^D > l^D$, and from (24) and (27) that $h_{hi}^D > h_{lac}^D > h^D$. The effect on wages of firms expansion will depend on the position of the aggregate supply curve. Since Chile is a developing country, the unskilled labor supply is expected to be very elastic in which case the effect on unskilled wages should be negligible. On the other hand, the supply of skills may be quite limited so that the skilled labor supply is expected to be quite inelastic, in which case the increase in demand could have a positive effect on skilled wages.

Prediction 3: A reduction in variable trading costs reduces both the Latin American and high income destination cutoffs. This follows directly from (16) and (20) where $\frac{\partial\varphi_x^{*lac}}{\partial\tau} > 0$ and

$\frac{\partial \varphi_x^{*hi}}{\partial \tau} > 0$. This will cause previous domestic firms to start exporting, and previous Latin American exporters to start exporting to high income destinations, in both cases requiring a skill upgrading. Total skilled service labor costs for Latin American exporters are $(a_1 + a_2)\overline{h}_s$, so the skill quality upgrading is given by a_2. Total skilled service labor costs for Latin American and high income destinations exporters are $(a_1 + a_2 + a_3)\overline{h}_s$, so the skill quality upgrading is given by (a_2+a_3) as compared domestic firms and by a_3 as compared previous Latin American exporters. The skill upgrading should therefore be stronger for firms in the productivity range between $\varphi_x'^{hi}(\eta)$ and $\varphi_x^{lac}(\eta)$, (area B in figure 4) as these are previous domestic producers that due to trade liberalization can now enter both Latin American and high income destinations. The skill upgrading for previous Latin American exporters entering the high destinations market should also be higher than the upgrading for domestic firms entring the Latin American market since by assumption $a_3 > a_2$. Figure 5 summarizes the predictions that I now take to the data to test empirically[9].

4 Empirical Strategy and descriptive data

This paper uses data from the national annual manufacturing survey (Encuesta Nacional Industrial Anual, ENIA) managed by the official Chilean Statistical Agency (Instituto Nacional de Estadísticas, INE). The survey is representative of the universe of Chilean manufacturing and covers the period 1995-2007. Practically, this dataset corresponds to a census, with some corrections to eliminate observations of single plants operating in a particular sector or region and thus avoid their identification. Although the ENIA survey started in 1979 and the most recent information is available up to 2010, the data used in this study is the largest panel dataset available validated by INE[10]. The unit of observation is a plant with ten or more employees and there are on average more than 4,500 plants per year in the sample. For each plant and year, the survey collects data on production, value added, sales, employment and wages, exports, investment, depreciation, energy use, and other characteristics. Plants are classified according to the International Standard Industrial

[9] In the data, I am unable to distinguish between skilled blue collar workers and service labor (white collars) as they are both included in the skilled labor category, so the combined effect will be an average between the two.

[10] This happens because the information prior to 1995 is recorded under different plant identifiers and because of confidentiality restrictions on plants identification for the most recent surveys. Additionally, export information is only collected since 1990.

Classification (ISIC). I deflate variables using price deflators provided by the Chilean Statistical Agency level at the 3 digit level of the ISIC classification. The second source of data for my study is administrative official customs records, which are available to me for the 1997-2007 period. From the customs records, for each firm I obtained quantities and unit values exported for each harmonized system 8-digit level product by country of destination. Using confidential information, I matched the firms in the ENIA with the customs data, obtaining a panel of employment, wages, exports and export destinations by firm. It is important to note that the manufacturing survey is collected at the plant level, while the customs records are at the firm level. Since all plants owned by the same firm share the same tax identification number, I aggregated the information across plants belonging to the same firm in the ENIA and created a dataset at the firm level. In the matched dataset, only 3.4% of firms are multi-plant firms. However, some firms own a large number of plants, so that in the original ENIA dataset almost 10% of plants belong to multi-plant firms. All previous studies using the ENIA data including Pavcnik (2002), Alvarez and Lopez (2005), Kasahara and Rodrigue (2008), and Navarro (2012) are unable to identify firm-level information and perform their study at the plant level. This is the first paper using the ENIA dataset for an analysis at the firm level.

I consider unskilled labor as unskilled direct production workers and blue-collar workers occupied in auxiliary activities to production and services, and skilled labor as specialized production workers, administrative employees, and managers. In order to construct an average wage measure for each firm, total wages were added to total benefits and then divided by the number of employees in each firm. This step is then repeated for skilled and unskilled labor in order to obtain an average wage for each type of worker.

Table 2 reports average plant characteristics for exporters and non-exporters in the sample. Exporters represent around 23% of observations in the panel, and it is clear that that they are much larger, more productive, and pay higher wages to both unskilled and skilled workers. There is also a vast difference between sole exporters to the Latin American region and firms that also export to high income destinations, with the latter being on average three times bigger than the former, and paying substantially higher average wages. Table 3 splits the sample according to firm size, where small firms are demined as firms with less than 50 employees, medium firms are firms with a number of employees between 50 and 200, and large firms employ over 200 people. As shown in the table, small and medium firms dominate the Chilean economy, while large firms represent less than 10% of the total. It is also clear from the data that the level of export participation varies greatly by size: while the majority of non exporters is made up by small firms, exporters to the Latin American region are mainly medium size firms, and the majority of exporters to high income destinations are large firms. Additionally, table 4 shows that while over 70% of large firms export, most of them to both Latin American and high income destinations, medium size firms are split 60-40 between non exporters and exporters, while only 9% of small firms export. Table 5 and 6 show average yearly wages for unskilled and skilled workers by firm size: quite interestingly, while it is clear that average wage increases with size, exporters pay much higher wages within each category, and average wage increases with the sophistication of export destinations, with exporters to higher income economies paying higher wages within each category. The "exporter premium" decreases with size, and seems to be higher for skilled workers. Additionally, the "high income destination exporter premium" even though not as large as the exporter premium, is still quite significant for skilled workers, particularly in the case of small firms. This simple table contradicts a widely held view that it is usually firm size that matters for wages: in fact these tables show that small firms exporting to high income destinations pay on average salaries higher not only than non exporters, but also than large exporting firms exporting only to Latin America, confirming that exporting may be a more important factor than size when it comes to determine firm-level wages.

Table 7 presents the skilled wage premium by 2-digit sector in the data between 1995 and 2007. There are remarkable inter-industry differences, however these seem remarkably stable throughout the period, as is the overall average, pointing to the fact that wage inequality is more of a within rather than between industry phenomenon. Table 8 presents the percentage of exporting plants in the total number of plants per each year, while table 9 presents the average export intensity (exports over total sales) for exporting plants by sector. While the percentage of exporters stays quite stable, export intensity increases throughout the period. Export intensity also varies quite strongly across industries.

Looking at destinations, Table 10 presents the number of Chilean exporting firms by destination for the first 20 Chilean export destination country ranked by the number of Chilean firms exporting there in 2007. Out of the first 10 destinations for number of exporting firms, 9 were Latin American destinations, witnessing to the importance of the local Latin markets for Chilean exporters. In each panel of figure 6, I plot the percentage represented by the export revenues, and by the number of exporting firms, over the total export revenue and total number of exporting firms, for the three major export destinations. Panel a shows that even though a percentage of firms ranging from 82 to 89 per cent exported to Latin America during the 1997-2007 time frame, Latin American exports represented a share of just over 20% of the total export revenues throughout the period analyzed. Just from this graph, it can be gathered that almost all exporters export to Latin America, but their shipments to these destinations are clearly well below the average exported value per firm. Panel b, on the other hand, shows that even though the market share of high income destinations has a slight declining trend, the percentage of firms exporting to this destination has been steadily increasing from 50% to over 60% approximately. Quite interestingly, a spike in the percentage of exporting firms to high income destinations can be noted in the years of entry in force of the Chile-EU and Chile-USA FTAs (from 61 to 67 per cent).

Table 11 above shows the number of markets served by individual firms. It presents the number of firms shipping to exactly a number of destinations between one and nine, to 10 or more, or 20 or more. Overall, roughly 25% of all exporting firms export to only one destination market, and over 50% export to three markets or less. On the other hand, about 6% of firms export to 20 markets or more. Figure 7a plots the frequency with which firms serve different number of markets: the frequency with which more markets are served declines smoothly up to the point where at most one firm serves a large number of markets. As for number of exported products (products defined at the 6-digit level of the Harmonized System Classification), a similar pattern appear, with about one fourth of the firm selling abroad just one product, over half of the firms selling three products or less, and around six percent exporting over 20 products. Data are presented in table 12 and panel b of figure 7. Table 13 combines the analysis by products/markets, presenting the percentage of firms in the sample exporting each combination of number of products and number of markets.

When looking at major destination markets, data confirm the sorting of firms into markets with different levels of sophistication: table 14 presents the percentage of exporters serving LAC destinations only, high income destinations only, or both LAC and high income destinations (firms serving other low income destinations only are marginal). Most exporters are almost evenly divided between firms exporting to LAC destinations only, and LAC and high income destinations, even though the two major categories show a diverging trend, with the latter steadily increasing its share during the period under study. There is a smaller of share of firms (12% on average) that only export to high income destinations without serving the Latin American market. When looking at new entrants in export markets, the sorting is even clearer: of all new exporters that I observe entering the LAC market, 89% are new exporters altogether, meaning that firms that begin to export almost always enter the LAC market. Of these new entrants, 65% enter the LAC market alone, while the remaining firms enter the local market in combination with another high income destination. On the other hand, of the new entrants in high income markets we observe in the panel, only 59% are new exporters, while the remaining are previous LAC exporters.

5 Export entry and labor market effect

I estimate a value added Cobb Douglas production function with three factors, skilled labor, unskilled labor, and capital, separately for each two-digit ISIC sector, and compute Total Factor Productivity (TFP) as a residual of the estimated function. I follow the Levinsohn and Petrin (2003)technique to account for the endogeneity of productivity shocks that are observed by the firm but not by the econometrician, using electricity consumption as the intermediate input that allows the identification of the elasticity of capital. Production fuction coefficients are presented in Table 15. Table 16 shows the percentage of total firms that export by decile of the log TFP distribution, distinguishing between total exporters, exporters to Latin American destinations, and exporters to high income destinations. There is clearly an increasing proportion of plants that export the higher their productivity level, and as predicted by the model the percentage of firms that export to high income destinations is lower than the percentage of firms that export to Latin American destinations across the productivity distribution, pointing to a higher productivity cutoff for exporting to these destinations. However, the table makes it clear that many less productive plants also export, which is inconsistent with the Melitz model but in line with my model's predictions, confirming that there must be other sources of heterogeneity across firms other than productivity in the data, which affect export status but do not necessarily translate into productivity differences.

Table 17 reports the coefficient of a dummy for old exporters and new exporters in a OLS regression of different plant outcomes controlling for sectorial and year fixed effects. Old-exporters are considered firms that were exporting in 1995, the first year in the sample, and continued doing so for at least ten consecutive years. New-exporters are plants that started to export at any time between 1996 and 2006 and continued exporting for at least two consecutive years. Looking at the first column of each outcome, it can clearly be seen that, even when controlling for year and sector, exporters and non-exporters are very different. Old and new exporters employ more labor (both skilled and unskilled) than non-exporters, pay higher wages, and are more productive than non-exporters. It can also be noted in Table 17 that the superior characteristics of exporters are stronger in old exporters than in new exporters. In the second column of each outcome, I add an additional control for TFP, so that the coefficients represent average differences in outcomes *conditional* on productivity. While productivity takes away part of the effect, there are still substantial differences between exporters and non-exporters even at the same level of productivity, meaning that crossing the export cut-off has effects on wages and employment independently on whether the firm is a high or low productivity type. The lower panel of the table splits the exporter categories into two additional groups, by export destinations: old exporters to high income destinations are defined as continuous exporters for at least ten consecutive years since the first year in the sample that export to a high income country for at least one year, while old exporters to Latin America are continuous exporters for at least ten consecutive years since the first year in the sample that only export to Latin American countries for the whole period. On the other hand, new exporters to high income destinations are new exporters that are observed exporting to at least one high income country in the year they begin exporting, while new exporters to Latin America are new exporters which only export to Latin America in the year they enter the export market. Once again, the coefficients are all significant and show that exporters to high income destinations employ more labor and pay higher wages for both types of labor than exporters to Latin American destinations. As I control for TFP, the coefficients are reduced, and especially so for the case of low skill wages, which in the case of new exporters are only marginally higher than for non exporters. However, in the case of high skill wages, new exporters to Latin America and high income destinations still pay a 24% and 18% premium respectively as compared to non exporters even after controlling for TFP.

Having established this clear correlation between export status and labor market variables even when controlling for productivity, there may still be some other unobservable variables that simultanously affect export participation, employment, and average wages and that may therefore be driving this relationship. In order to account for possible self-selection, in the remaining of this section I use a propensity score matching procedure combined with a difference-in –difference approach to detect the effect of starting to export on employment and wages of different types of workers and other outcomes. The identification strategy to estimate the casual effect of exporting on employment and wages is therefore to match *new exporters* with non exporters on the basis of a number of selection variabes. Drawing from the impact evaluation literature, the parameter I am interested in estimating is the so-called average treatment effect on the treated (ATT), the effect of the treatment (beginning to export) on firms that actually receive it:

$$\tau_{ATT} = E(\tau \mid Exp = 1) = E\left[Y(1) \mid Exp = 1\right] - E\left[Y(0) \mid Exp = 1\right] \tag{28}$$

The expected value of the ATT is defined as the difference between expected values of the outcome with and without treatment for those that were actually treated. Ideally one would like to know the counterfactual mean for those being treated $E\left[Y(0) \mid Exp = 1\right]$, or what would have been the performance of the exporting firms had they not started to export, which is clearly not observed. Therefore, in order to estimate ATT I need to choose a suitable substitute of the counterfactual. Given that the decision to export is not random, using the mean outcome of untreated plants (those that did not export), $E\left[Y(0) \mid Exp = 0\right]$, is not possible because it is likely that variable that determine the treatment decision also affect the outcome, leading to a selection bias. Different techniques can be used to deal with this issue. A number of those focus on the estimation of treatment effects under the assumption that the treatment satisfies some form of exogeneity: under this assumption, all systematic differences in outcomes between the treated and the comparison observations with the same values of covariates would be attributable to tratment. In this case I implement the propensity score matching (PSM) method, which constructs a statistical comparison group that is based on a model of the probability of beginning to export, using observed characteristics. The propensity score is defined by Rosenbaum and Rubin (1983) as the conditional probability of receiving a treatment given pretreatment characteristics:

$$p(X) = Pr(Exp = 1 \mid X) = E(Exp \mid X)$$

where X is the multidimensional vector of pretreatment covariates.

As a result, the PSM estimator for ATT can be defined as the mean difference in outcomes, weighting the comparison units by the propensity score of the treated observations:

$$\tau_{ATT}^{PSM} = E_{P(X)|Exp=1} \{E [Y(1) \mid Exp = 1, P(X)] - E [Y(0) \mid Exp = 0, P(X)]\}$$

Note that two assumption need to hold for this method to return unbiased results. The first assumption is *common support*: treatment observations need to have similar comparison observations in the propensity score distribution, so that a large region with participant and nonparticipant observations exists ($0 < P(Exp = 1 \mid X) < 1$). Balancing tests can be conducted to check whether within each quantile of the propensity score distribution the average propensity score and mean of X are the same. For PSM to work, the treatment and comparison groups must be balanced, so that similar propensity scores are based on similar observed Xs. Although a treated group and its matched nontreated comparison might have the same propensity scores, they are not observationally similar if misspecification exists in the participation equation: the distributions of the treated group and the comparison group must be similar across the covariates. The second assumption is *unconfoundedness*: this states that given a set of observable covariates X that are not affected by the treatment, potential outcomes Y are independent of treatment assignment ($Y(0), Y(1) \amalg Exp \mid X$). In practice, this assumption implies that treatment is based entirely on observed characteristics; if unobserved characteristics determine program participation, unconfoundedness will be violated and it will be necessary to rely on identification strategies that explicitly allow selection on unobservables. While this assumption is not directly testable, the panel nature of the data allows me to combine PSM with the double-difference method (DD), which as long as unobserved heterogeneity is time-invariant, will eliminate any remaining selection bias. I therefore estimate the following:

$$DD = E_{P(X)|Exp=1} \{E [(Y_t(1) - Y_{t-1}(1) \mid Exp = 1, P(X)] - E [Y_t(0) - Y_{t-1}(0) \mid Exp = 0, P(X)]\}$$

where t is the post-treatment period (year the firm begins to export) and t-1 is the pretreatment period[11]. More explicitly, with panel data over two periods $t = \{1, 2\}$, the local linear DD for the mean difference in outcomes Y_{ij} across new exporters i and nonexporters j in the common support

[11] This is based on the identifying assumption: $E [(Y_t(0) - Y_{t-1}(0) \mid Exp = 1, P(X)] = E [Y_t(0) - Y_{t-1}(0) \mid Exp = 0, P(X)]$

is given by (Smith and Todd (2005)):

$$ATT^{DD}_{PSM} = \frac{1}{N_T}\left[\sum_{i\in T}(Y^T_{i2} - Y^T_{i1}) - \sum_{j\in C}\omega(i,j)(Y^C_{j2} - Y^C_{j1})\right]$$

where N_t is the number of new exporters i and $\omega(i,j)$ is the weight used to aggregate outcomes for matched nonexporters j, T is the treatment group of new exporters and C the control group of never exporters.

The first step is therefore to estimate a probit model for the probability of being treated (treatment is defined as a firm beginning to export and remaining in the export market a minimum of two consecutive years) conditional on a set of observables X. As the control group needs to be very similar to the treatment group in terms of its predicted probability of beginning to export, I need to include a number of variables that are not influenced by the treatment. For this study, I consider lagged levels (t-1) of productivity, ratio of skilled workers to total employment, total employment (proxy for size), a dummy for foreign property, and a full set of dummies for industry and year to control for common supply and demand shocks. Results of the probit estimation are presented in Table 18. As can be noticed in the table, firms with ex-ante larger size, productivity and foreign owned are more likely to begin to export. However, ex-ante employment's skilled composition does not have an effect on the decision to start exporting. Generally, except for total size, no labor related variables I attempted to include in the specification, including average wages, have an effect on the decision to start exporting. There is no indication that firms that pay higher wages or have a higher skilled/unskilled labor composition are more likely to begin exporting.

Once I estimate the propensity scores, I then match the groups using the method of the nearest neighbor with replacement. That is, for each new export firm with propensity score p_i, a firm j from the control group is selected such that its propensity score is as close as possible to i, and the same control can be matched with more than one treatment. I implement the methodology following the procedure developed by Leuven and Sianesi (2003) in Stata. Table 19 shows the means of the observable covariates in the treated and control group before and after matching. It can be easily seen that the group of nonexporters reweighted after matching is not significantly different from the group of exporters across all covariates, as shown by the t-statistic in the last column. This is also shown in Figure 8 which presents a dot chart summary of the covariate imbalance for selected variables for each sample, showing the standardized percentage bias for each covariate before and after matching.

In this figure, it is important to look at the balance between the two groups before and after matching across size and productivity, two variables that are clearly highly correlated. Before matching, there is a 100% bias in size and over 60% in TFP among exporters and non exporters. After matching, there is no statistically significant difference in size and productivity between the treatment sample of exporters and the control sample of non exporters. This matching can therefore allow me to estimate the impact of beginning to export on labor market outcomes by comparing export entrants with very similar domestic firms in terms of past productivity shocks. In terms of the model, I am practically comparing firms just above the productivity/export ability cutoff function (export entrants, corresponding to firms in areas A and B in figure 4) with similar firms just below the cutoff that do not enter the export market, and by controlling for pre-export productivity shocks of new exporters I should be able to remove the endogeneity of the export decision.

After obtaining the matched samples, I run a difference-in-difference regression using the treated and control matched observations in the common support of the propensity score of the outcome variables of interest on a dummy for the treatment variable to obtain the Average Treatment on the Treated (ATT) effect. The outcome variables that I consider are unskilled and skilled labor employment, unskilled and skilled labor average wages, total sales, and TFP. The coefficients of the treatment dummies are then the impact indicators. Results for the coefficients of the treatment effects are shown in Table 20 for the whole sample.

As predicted by the model, the results suggest that beginning to export has a positive effect on unskilled labor employment: firms expand and hire more labor to supply the larger international market. Indeed, as shown in columns (1) and (2), beginning to export increases unskilled labor by 12.5% in the first year after beginning to export, and remains unchanged in the second year, relative to firms in the control group. On the other hand, average salaries for skilled labor increase as seen in columns (3) and (4) by 10.4% in the first year, and are unchanged in the second year after beginning to export, respectively in the treatment group relative to the control group.

The impact of starting to export on high-skill employment is less clear. Starting to export leads to an increase in white-collar employment by more than 5% in treated firms relative to the control group in the first year, but this positive effect is not statistically different from zero. It would therefore seem that in the effect of exporting on skilled employment the quality composition effect dominates the quantity effect that we would expect for skilled production labor. Finally, blue-collar wages do not seem to be affected on average by the treatment in the total sample of firms, and the combined coefficients for both years are actually marginally negative even though not statistically significant.

The lower panel of table 20 also reports results for two additional outcomes: sales and productivity. As it could be expected, new exporters increase sales by 12.5% in their first exporting year relative to non exporters, and by an additional 6% in the next year. Contrary to some previous empirical literature, most notably De Loecker (2007), but in fact consistently with the Melitz model on which my model is based, I do not find a positive impact of beginning to export on productivity.

The results on high-skill employment and wages are consistent with a process of skill upgrading due to starting to export as long as the wage increases reflect a change in the composition of the skilled labor force within the firm towards better quality and therefore better paid workers. Unfortunately, the data does not allow me to disentangle the effect between a possible price increase for skilled production workers and heterogeneity in worker quality, since I do not have information on specific workers. The higher wages paid by firms could therefore in theory also reflect a "fair wage" mechanism, implying unequal wages for identical workers between exporters and non exporters, or "efficiency wages" paid by exporters to induce increased effort and improve quality for foreign markets. As far as unskilled labor is concerned, while beginning to export creates unskilled labor employment in exporting firms, unskilled labor compensation does not seem to be affected by the firm's entry into international markets, a result which is consistent with the assumption of a relatively elastic labor supply for unskilled workers. The finding that the effect of starting to export would lead to a relatively higher increase of white-collar wages relative to blue-collar wages together with the relatively greater effects on blue-collar employment can help to offer an explanation for the increase in inequality associated to globalization.

5.1 A triple difference estimator

As already indicated in the previous section, the combination of matching techniques with Difference-in-differences (DID) is likely to provide unbiased estimates of the causal effects of entering the export market, as the DID essentially removes the effects of any unobserved time-invariant common shock between treated and untreated firms and provides a clear estimate of the treatment variable on the difference in labor market outcomes between exporters and non exporters. However, if there are time variant unobservables that determine treatment status (the decision to export), unconfoundedness is violated and the estimates will be biased. To rule out this possibility, I use a triple-difference strategy combined with propensity score matching in which I compare the difference in labor market outcomes (first difference) between exporters and matched non-exporters (second difference) for firms experiencing above versus below-median tariff reductions during Chile's trade liberalization between 1996 and 2007 (third difference). With the signing of free trade agreements, Chile's export destination countries progressively reduced tariff levied on Chilean products, but there was a great deal of variation in the tariff reduction by products and industries. Therefore, using TRAINS tariff data, I construct for each 4 digit ISIC industry the simple average of the average yearly reduction in tariff percentage points over the sample period of the first five export destinations for Chile in that industry in 2007, obtained by the UN Comtrade database. I then associate the calculated tariff cuts to each firm based on the 4 digit industry in which it operates, to measure its exposure to a reduction in trade barriers, and divide firms in two groups: those experiencing above median, and those experiencing below median reductions. Following trade liberalization, industries experiencing greater reductions in trade barriers exhibit, other things equal, greater reductions in the export productivity cutoff, and have therefore enhanced opportunities to increase exports. On the other hand, in industries with low or no tariff reductions, there is no change in the export cutoff, and entry of firms in the export market should therefore be due to endogenous unobservables. It is also important to note that even though tariff cuts could also be nonrandom, in the Chilean case the aggregate cut across destinations is dependent upon the tariff cuts negotiated in the trade agreements with Chile's main trade partners. It is therefore likely that each negotiating country may have inserted provisions to protect its most sensitive industries from Chilean competition through a longer tariff elimination schedule or by mainaining protection altogether in these industries. In addition to the aggregate tariff reduction averaging out across destinations, it is clear that destination countries would seek to maintain protection exactly in those sectors where Chilean competition is stronger, ie. sectors in the Chilean economy in which it is more likely to find competitive and productive firms. As I am trying to estimate a causal effect, these are exactly the firms that I would like to exclude from the estimation: firms that receive a higher cut are therefore certainly not more likely to be endogenously more productive, and are likely to be starting to export due to an exogenous reduction in export costs.

The identification strategy is therefore straightforward: I match export entrants with similar non exporters in the high reductions group (H=1), and calculate average treatment effects, and repeat the same procedure for the low reductions group (H=0). I then construct a sample with the matched (treatment and controls) observations for the two groups, and run a regression of labor market outcomes on a dummy for treatment, a dummy for high reduction, and an interaction variable between treatment and high reduction. The coefficient on the interaction dummy is the triple difference estimator, ie the causal effect of the first group "cleaned" of the endogenous portion given by the coefficient on the second group. Formally, I estimate DDD defined as:

$$E_{P(X)|Exp=1}\left\{E\left[Y_t(1)-Y_{t-1}(1)\mid Exp=1,H=1,P(X)\right]-E\left[Y_t(0)-Y_{t-1}(0)\mid Exp=0,H=1,P(X)\right]\right\}$$
$$-\,E_{P(X)|Exp=1}\left\{E\left[(Y_t(1)-Y_{t-1}(1)\mid Exp=1,H=0,P(X)\right]-E\left[Y_t(0)-Y_{t-1}(0)\mid Exp=0,H=0,P(X)\right]\right\}$$

Table 21 presents the estimation results for year one. The higher panel of the table shows the effect of exporting on high and low skilled employment. The results of my previous estimation are confirmed: starting to export increases unskilled labor by 21% for the high tariff reduction group, but has no effect for the low tariff reductions group. The difference between the two groups is 18%, significant at the 5% level. As for wages, presented in the lower panel of table 21, as expected exporting has a strong and highly significant effect on skilled wages growth for the high reduction group (19%), and a much lower effect in the low reduction group. In year one, the triple difference estimator is 12%, quite similar to the one obtained with our previous methodology, even though the standard error is high and the estimate is just below the 10% significance level. Therefore, firms that are induced to start exporting by tariff cuts increase the skill composition of their skilled workforce, expand low skilled employment, but low skill wages are unchanged. The previous finding of a positive contribution of enhanced export opportunities brought about by trade liberalization to an increase in inequality is therefore confirmed.

5.2 An analysis of exporting by destinations

Moving to the analysis by export destination, I now repeat the analysis performed in the first part of this section, considering as treatment entering the LAC market only, and entering some high income markets, respectively. I repeat the same matching procedure, pairing LAC and HI export entrants with a control group of never exporters. Probit estimates and balancing tests return results very similar to those shown in table 18 and 19 so they are not reported here. Table 22 presents the ATT results for new exporters entering a Latin American destination market: these correspond to firms located in area A in figure 4. New exporters to a LAC market increase sales by almost 9% in the year they begin exporting as compared firms in the control group, a smaller increase than the one I had found in the sample of all new exporters. As a consequence, the increase in unskilled labor employment is more modest (9%), and not statistically significant. The effect on average skilled wages is also smaller than the one found in the complete sample (9.5%), and only significant at the 10% level. The results of no effects on low skill wages and high skill employment is confirmed: overall, these results seem in line with the findings of Brambilla et al. (2012), who are unable to find any effect on employment and wages for Argentinian firms that only export to the regional market. Table 23 presents the results of average treatment effects for new exporting firms that begin serving the Latin American market *and* at least one high income destination in the first year they export: these correspond to firms located in area B in figure 4. Clearly, the labor market outcomes for these are firms are much stronger than for the firms that only enter the regional market. First of all, these firms expand sales by 16.5% in the year they begin exporting as compared to non exporters in the control group. They are therefore growing very quickly in order to be able to serve customers in different markets abroad. As a consequence, they need a strong expansion in their production labor force: the ATT for low skill employment is 16.1% in the first year. Additionally, in the first year there is also an effect on skilled employment, that expands 10.5% as compared the control group, significant at the 10% level. Concurrently with even such a strong positive effect on unskilled labor demand, there is still no effect on unskilled average wages, while the effect on skilled wages is 11.2% in the first year. The results of stronger effects for firms entering high destination markets as compared those entering Latin American markets only are therefore in general in line with the predictions of the theoretical model. Next, I repeat the matching and balancing procedure of tables 18 and 19 for previous exporters to Latin American countries beginning to export to high hincome destinations, which are once again matched with non-exporters. The probit estimates are again quite similar to the previous ones, even though previous productivity is not a significant determinant of treatment in this case: unlike for new exporters, there is no indication that previous exporters that upgrade destinations are those with higher lagged tfp. Finally, table 24 shows the impact for previous LAC exporters that begin exporting to high income destinations, corresponding to firms located in area C of figure 4. For these firms, adding a high income market to their export base still has an effect on sales, but notably more limited as compared new exporters altogether: sales expand by 8% in the first year, with only a 10% level of statistical significance. As a result, I find no effect on low skilled employment, and low skill wages remain unchanged as in all previous scenarios. On the other hand, as far as high skill labor is concerned, I find a 15% positive effect on wages in the first year, and a 11% positive effect on employment in the second year, statistically significant at the 1% and 5% level respectively. Figure 8 summarizes the first year results on the different outcomes by destination: comparing these to figure 5 show that the model prediction of a sorting across destinations are overall confirmed.

6 Conclusions

This paper has analyzed the effects of exporting on labor outcomes at the firm level in one of the most successful open economies in the developing world. Over the period under examination, Chilean manufacturing exports more than tripled, raising questions on whether the trade liberalization policies undertaken by the country in the same period may have contributed to the high levels of income inequality still prevailing in the country. Given the well known strong correlation between firm size, productivity, average wages paid, and export status, the main question that this study has tried to answer is whether larger firms paying higher wages select themselves in the export market, or if exporting does in fact lead to employment and skill level changes at the firm level. Using matched sample techniques, I constructed conterfactuals that take into account potential firm selection in export markets, and the results show that beginning to export does indeed have an impact on firm level employment and return to skill. By increasing market size, exporters need to hire additional production workers, and due to the higher sophistication of export markets they hire higher quality skilled workers. Additionally, the detailed nature of the dataset allows me to further analyze the results according to the main export destinations. I find that the responses are heterogeneous across destinations, with strong effects for new exporters to high income destinations, and relatively lower effects for firms that just begin serving a Latin American country.

While a lot more work remains to be done in the area of the relationship between trade liberalization and wage inequality, I believe that this paper contributes to uncover an important way in which globalization can create winners and losers. While the Hecksher-Olin model predicts that unskilled labor, the relatively abundant factor of production, should be benefited by the reduction in trade barriers in developing countries, when we allow for firm heterogeneity I show that exporting, and especially exporting to high skill destinations, is per se a skilled activity, and it is skilled workers employed by exporting plants that gain when trade expands. In a developing country setting like Chile's, this points clearly to the pressing need to couple export promotion policies for small and medium firms with an education reform that could help create locally the skills that these firms will more and more require.

References

Alvarez, Roberto and Lopez, Ricardo (2005). "Exporting and performance: Evidence from Chilean plants", *Canadian Journal of Economics* 38(4): 1384–1400.

Amiti, Mary and Davis, Donald R. (2012). "Trade, Firms, and Wages: Theory and Evidence," *Review of Economic Studies* 79(1): 1-36.

Arnold, Jens M. and Javorcik, Beata (2009). "Gifted kids or pushy parents? Foreign direct investment and plant productivity in Indonesia", *Journal of International Economics* 79(1): 42-53.

Bernard, Andrew B., Redding, Stephen J. and Schott, Peter K. (2007). "Comparative Advantage and Heterogeneous Firms", *Review of Economic Studies* 74(1): 31-66.

Brambilla, Irene, Lederman, Daniel and Porto, Guido (2012). "Exports, Export Destinations and Skills", *American Economic Review* 102 (7): 3406-3438.

Bustos, Paula (2010). "Trade Liberalization, Technology and Skill Upgrading. Evidence from Argentina", Harvard University, mimeo.

Chen, Wenjie (2010). "The Effect of Investor Origin on Firm Performance: Domestic and Foreign Direct Investment in the United States", George Washington University, mimeo.

De Loecker, Jan (2007). "Do Exports Generate Higher Productivity? Evidence from Slovenia", *Journal of International Economics* 73(1): 69–98.

Dixit, Avinash K. and Stiglitz, Joseph E. (1977). "Monopolistic Competition and Optimum Product Diversity," *American Economic Review* 67(3): 297-308.

Fryges, Helmut and Wagner, Joachim (2010). "Exports and Profitability: First Evidence for German Manufacturing Firms", *The World Economy* 33(3): 399-423.

Goldberg, Pinelopi K. and Pavcnik, Nina (2007). "Distributional Effects of Globalization in Developing Countries," *Journal of Economic Literature* 45(1): 39-82.

Girma, Sourafel and Gorg, Holger (2007). "Evaluating the foreign ownership wage premium using a difference-in-differences matching approach", *Journal of International Economics* 72(1): 97-112.

Görg, Holger, Hanley, Aoife and Strobl, Eric (2008). "Productivity Effects of International Outsourcing: Evidence from Plant-level Data", *Canadian Journal of Economics* 41 (2): 670–688.

Helpman, Elhanan, Itskhoki, Oleg and Redding, Stephen (2010). "Inequality and Unemployment in a Global Economy," *Econometrica* 78(4): 1239-1283.

Huttunen, Kristiina (2007). "The Effect of Foreign Acquisition on Employment and Wages: Evidence from Finnish Establishments," *The Review of Economics and Statistics* 89(3): 497-509.

Kasahara, Hiroyuki and Rodrigue, Joel (2008). "Does the Use of Imported Intermediates Increase Productivity? Plant-level Evidence," *Journal of Development Economics* 87(1): 106-118.

Krishna, Pravin, Poole, Jennifer P. and Senses, Mine Z. (2011). "Trade liberalization, firm heterogeneity, and wages : new evidence from matched employer-employee data," *Policy Research Working Paper Series* 5711, The World Bank.

Krugman, Paul R. (1979). "Increasing returns, monopolistic competition, and international trade," *Journal of International Economics* 9(4): 469-479.

Levinsohn, James and Petrin, Amil (2003). "Estimating Production Functions Using Inputs to Control for Unobservables." *Review of Economic Studies*, 70 (2): 317-341.

Leuven, Edwin and Sianesi, Barbara (2003) PSMATCH2: Stata Module to Perform Full Mahalanobis and Propensity Score Matching, Common Support Graphing, and Covariate Imbalance Testing. Statistical Software Components. Boston College Department of Economics, http://ideas.repec.org/c/boc/bocode/s432001.html.

Melitz, Marc J. (2003)."The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica* 71 (6): 1695-1725.

Navarro, Lucas (2012). "Plant level evidence on product mix changes in Chilean manufacturing," *Journal of International Trade & Economic Development* 21(2): 165-195.

Pavcnik, Nina (2002). "Trade Liberalization, Exit, and Productivity Improvement: Evidence from Chilean Plants," *Review of Economic Studies* 69(1): 245-76.

Rosenbaum, P. R., and Rubin,D.R. (1983). "The central role of the propensity score in observational studies for causal effects," *Biometrika* 70: 41-55.

Serti, Francesco and Tomassi, Chiara (2008). "Self-Selection and Post-Entry Effects of Exports: Evidence from Italian Manufacturing Firms", *Review of World Economics* 144 (4): 660–694.

Smith, Jeffrey A., and Todd, P.E. (2005). "Does Matching Overcome Lalonde's Critique of Nonexperimental Estimators?" *Journal of Econometrics* 125: 305-353.

Verhoogen, Eric A. (2008). "Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector," *The Quarterly Journal of Economics* 123(2): 489-530.

Yeaple, Stephen R. (2005). "A simple model of firm heterogeneity, international trade, and wages", *Journal of International Economics* 65(1): 1-20.

Appendix

A. Derivation of the demand function facing each firm *i*.

Consumers maximize:

$$U = \left[\sum_{i=1}^{n} x_i^{\rho}\right]^{\frac{1}{\rho}}$$

subject to the constraint:

$$Y = \sum_{i=1}^{n} x_i p_i$$

Setting up the Lagrangian:

$$\mathcal{L} = \left[\sum_{i=1}^{n} x_i^{\rho}\right]^{\frac{1}{\rho}} + \lambda \left(Y - \sum_{i=1}^{n} x_i p_i\right)$$

The first order conditions are:

$$\frac{\partial \mathcal{L}}{\partial x_i} = \left[\sum_{i=1}^{n} x_i^{\rho}\right]^{\frac{1-\rho}{\rho}} x_i^{\rho-1} - \lambda p_i = 0 \;\; \forall\, i \in \{1, ..., n\}$$

Dividing between the first and the i-th equations yields:

$$\left(\frac{x_i}{x_1}\right)^{\rho-1} = \left(\frac{p_i}{p_1}\right)$$

Rearranging, I obtain:

$$p_i x_i = p_1 x_1 \left(\frac{p_i}{p_1}\right)^{\frac{\rho}{\rho-1}}$$

Summing over all $i \in \{1, ..., n\}$:

$$\sum_{i=1}^{n} p_i x_i = \sum_{i=1}^{n} p_1 x_1 \left(\frac{p_i}{p_1}\right)^{\frac{\rho}{\rho-1}}$$

By substituting this into the budget constraint and rearranging I get:

$$Y = \sum_{i=1}^{n} p_1 x_1 \left(\frac{p_i}{p_1}\right) = p_1^{-\frac{1}{\rho-1}} x_1 \sum_{i=1}^{n} p_i^{\frac{\rho}{\rho-1}}$$

By defining $P = \left[\sum_{i=1}^{n} p_i^{\frac{\rho}{\rho-1}}\right]^{\frac{\rho-1}{\rho}}$, the aggregate price of the differentiated good, I may write:

$$Y = p_1^{-\frac{1}{\rho-1}} x_1 P^{\frac{\rho}{\rho-1}}$$

Solving for $x_1$gives the demand function associated with this utility function:

$$x_1 = \left(\frac{Y p_1^{-\frac{1}{1-\rho}}}{P^{\frac{\rho}{\rho-1}}} \right) = \frac{Y}{P} \left(\frac{p_i}{P} \right)^{-\frac{1}{1-\rho}}$$

so that the demand for each variety $x_i$of the differentiated good is given by the real income $E = \frac{Y}{P}$ times a constant elasticity function of the relative price $\frac{p_i}{P}$ of each variety.

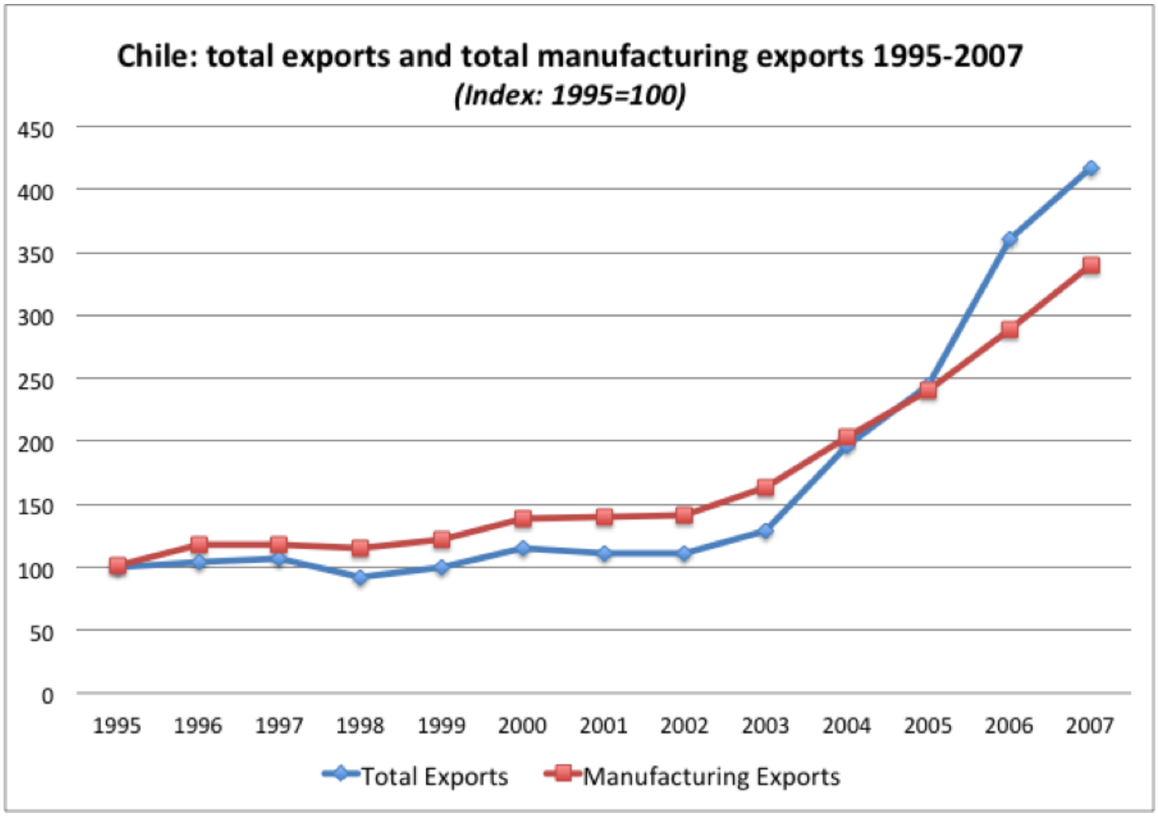
B. Tables and figures

Table 1: Chile's trade agreements entered into force in the 1995-2007 period.

Partner	Entry into force	Type (*)	% export
MERCOSUR (Argentina, Brazil, Paraguay, Uruguay)	October 1996	FTA	10.9
Canada	July 1997	FTA	0.8
Peru	July 1998	PPA	2.4
Mexico	August 1999	FTA	3.9
Costa Rica	February 2002	FTA	0.4
El Salvador	June 2002	FTA	0.1
European Union	February 2003	EAA	24.7
U.S.A	January 2004	FTA	15.4
Rep. Of Korea	April 2004	FTA	5.8
EFTA (Iceland, Liechtenstein, Norway, Switzerland)	December 2004	FTA	0.6
P4 (Brunei, New Zealand, Singapore)	May 2006	EAA	0.1
China	October 2006	FTA	8.8
India	August 2007	PPA	3.4
Japan	September 2007	FTA	10.8
Guatemala	December 2007	FTA	0.4

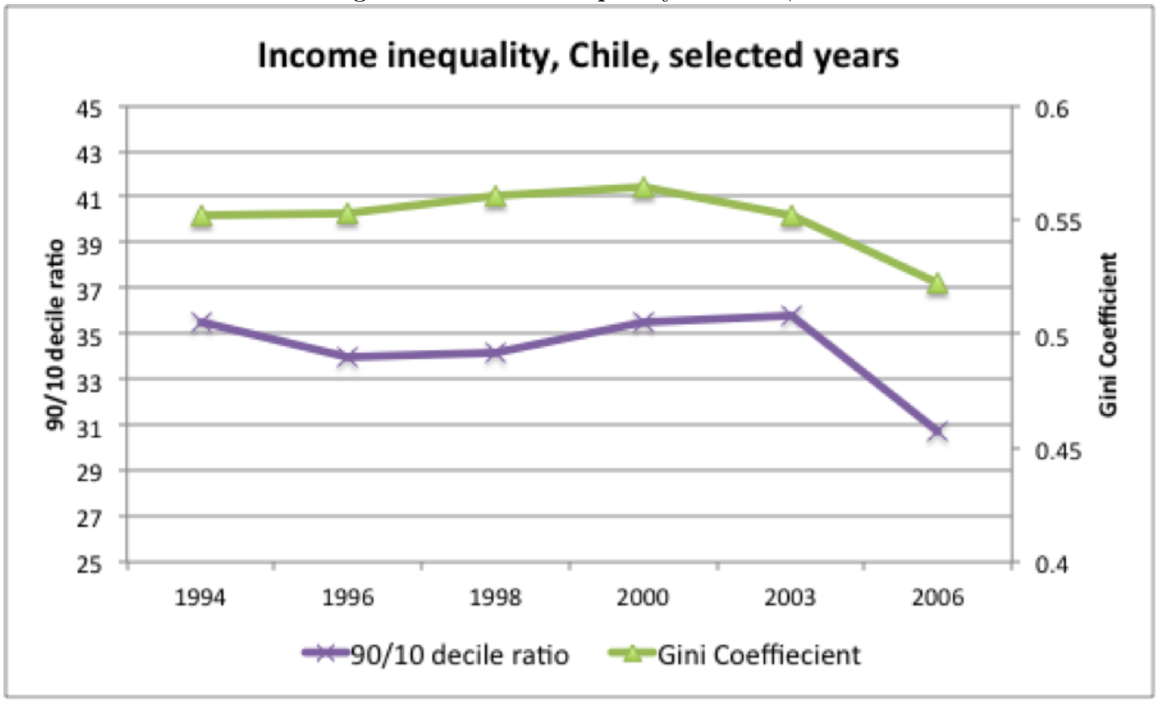
Source: Organization of American States (OAS) Note: (*) FTA = Free Trade Agreement, EAA = Economic Associacion Agreement (Trade Provisions), PPA = Partial Preferential Agreement

Figure 1: Chile: total exports and total manufacturing exports 1995-2007 (Index: 1995=100)



Source: Chilean Government, General Direction of International Economic Relations (DIRECON)

Figure 2: Income inequality in Chile, 1994-2006



Source: CEPALSTAT

Figure 3: Export cutoff functions, Latin American and high income destinations

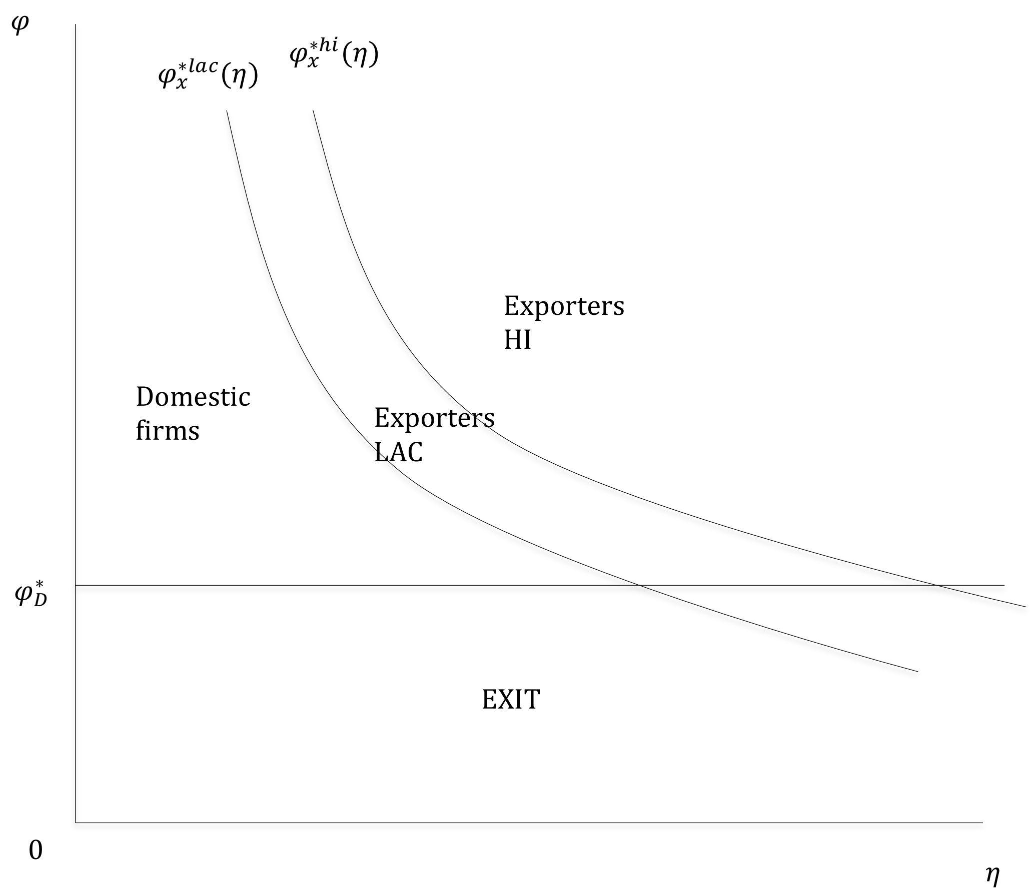


Figure 4: Export cutoff functions after trade liberalization, Latin American and high income destinations

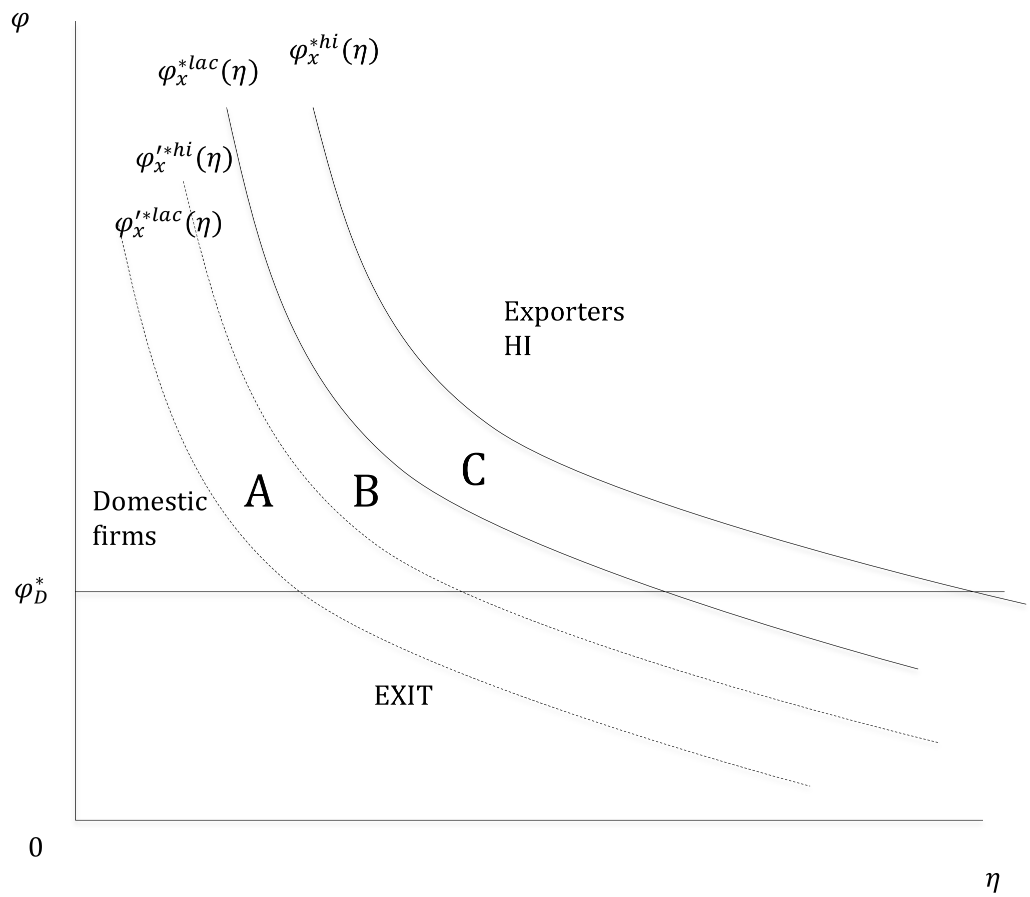


Figure 5: Model predictions of sign effect of exporting on labor outcomes, by destination

	Labor demand			Wages		
	Unskilled	Skilled		Unskilled	Skilled	
		Production	Service		Production	Service
enter LAC (new)	+	+	0	0	+	+
enter HI (new)	+++	+++	0	0	+++	+++
LAC to HI	++	++	0	0	++	++

Table 2: Average sample statistics

	Non Exporters	Exporters	Exporters LAC only	Exporters LAC + HI
Sales (thousands of pesos)	1,931,640	22,468,712	6,823,715	42,662,994
Log TFP	8.845	9.501	9.388	9.745
Unskilled Employment	28	131	70	198
Skilled Employment	19	83	51	132
Unskilled yearly wage (pesos)	3,189,838	3,995,656	3,701,542	4,270,289
Skilled yearly wage (pesos)	6,332,412	10,800,000	9,276,330	11,600,000
Observations (firm/year)	36,916	10,685	3,850	4,681

Table 3: Percentage firm size, by export category

	Total sample	Non Exporters	Exporters	Exporters LAC only	Exporters LAC + HI
Small	66%	77%	27%	37%	14%
Medium	25%	19%	44%	47%	40%
Large	9%	3%	29%	15%	46%
Total	100%	100%	100%	100%	100%

Table 4: Percentage export category, by firm size

	Non Exporters	Exporters	Total	Exporters LAC only	Exporters LAC + HI
Small	91%	9%	100%	5%	4%
Medium	61%	39%	100%	15%	22%
Large	27%	73%	100%	13%	56%
Total	77%	23%	100%	10%	12%

Table 5: Descriptive statistics: avg, yearly unskilled wage, by firm size

	Non Exporters	Exporters	Exporters LAC only	Exporters LAC + HI
Small	2,710,305	3,394,105	3,247,920	3,775,324
Medium	3,210,843	3,625,375	3,578,454	3,871,468
Large	3,732,052	4,141,569	3,765,062	4,348,156

Table 6: Descriptive statistics: avg, yearly skilled wage, by firm size

	Non Exporters	Exporters	Exporters LAC only	Exporters LAC + HI
Small	4,129,847.00	7,891,645.00	7,531,059.00	10,700,000.00
Medium	6,810,802.00	10,100,000.00	9,499,101.00	11,300,000.00
Large	8,768,417.00	11,200,000.00	9,428,725.00	11,700,000.00

Table 7: Wage premium by sector (skilled wage/unskilled wage)

sector	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Food & Beverages	2.95	2.60	2.64	2.71	2.38	2.27	2.24	2.20	2.32	2.30	2.37	2.53	2.63
Textiles	2.19	2.00	1.98	1.99	1.95	1.80	1.77	1.73	1.72	1.76	1.71	1.79	1.92
Wood	2.44	2.25	1.93	1.92	2.07	2.02	2.00	1.79	2.02	1.80	1.83	1.96	1.89
Pulp & Paper	1.75	1.70	1.58	1.67	1.61	1.67	1.59	1.73	1.72	1.65	1.64	1.50	1.70
Chemicals	2.86	3.26	2.49	3.46	2.91	2.75	2.76	2.51	2.65	2.60	2.93	2.64	3.26
Non Metallic	2.59	2.34	2.57	2.16	2.02	3.69	1.86	1.96	2.06	1.94	1.57	1.79	1.61
Metallic	2.60	1.70	1.60	1.72	2.07	1.52	1.91	2.00	1.42	1.73	1.58	2.22	1.90
Machinery	2.45	1.86	1.72	1.85	2.32	1.91	2.23	1.87	2.26	1.76	1.76	1.79	1.96
Other Industries	1.46	1.59	1.63	1.49	1.76	1.69	1.74	2.02	1.84	1.74	1.84	2.02	1.90
Total	2.75	2.49	2.34	2.63	2.48	2.42	2.32	2.31	2.28	2.22	2.25	2.21	2.47

Table 8: Exporting plants as % of total plants

sector	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Food & Beverages	23.0	22.7	20.8	20.8	20.1	19.3	19.3	21.8	20.9	23.1	23.6	24.2	24.6
Textiles	23.9	21.8	23.2	23.3	20.4	19.3	17.7	15.8	18.6	17.6	19.2	21.7	18.1
Wood	23.3	21.1	20.5	20.4	22.9	22.9	21.8	23.1	25.5	21.3	21.4	21.3	22.6
Pulp & Paper	19.2	21.4	21.3	22.5	18.4	19.4	19.5	18.5	16.9	16.7	16.6	19.9	19.9
Chemicals	38.7	36.7	40.3	39.8	35.5	32.2	33.6	32.4	32.4	30.2	33.1	33.1	35.3
Non Metallic	17.6	18.9	18.8	18.2	20.4	18.7	18.9	15.6	18.9	20.5	18.6	18.3	19.8
Metallic	41.3	47.2	53.8	53.1	39.0	38.1	33.7	31.1	31.8	38.4	36.4	39.3	35.7
Machinery	17.9	17.3	18.1	18.4	18.5	16.9	17.6	16.7	18.4	15.7	16.5	16.5	17.9
Other Industries	24.1	18.7	25.4	23.6	23.5	23.4	21.1	20.0	21.0	16.7	29.4	17.1	16.7
Total	24.1	23.2	23.5	23.5	22.3	21.2	21.2	21.1	21.8	21.3	22.3	23.0	23.3

Table 9: Average export intensity, by sector

sector	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Food & beverages	20.9	21.3	19.9	18.1	18.7	16.1	20.5	25.0	21.6	23.8	26.2	24.8	20.9
Textiles	6.7	7.9	9.0	8.0	7.7	9.9	10.3	8.3	8.6	9.2	8.6	8.7	6.6
Wood	28.2	25.8	28.0	26.4	34.9	35.5	42.7	43.2	44.3	43.4	43.7	37.1	38.5
Pulp & Paper	41.3	37.5	37.2	27.3	30.4	27.7	27.0	30.9	39.3	43.2	41.6	42.7	47.0
Chemicals	14.8	9.4	12.4	22.0	7.2	7.2	11.3	13.7	14.4	18.0	14.9	8.7	27.5
Non Metallic	2.3	3.5	3.5	2.9	4.9	24.9	2.4	3.6	4.1	3.4	3.3	2.8	3.1
Metallic	40.8	53.1	47.4	51.5	40.0	38.9	52.1	30.4	50.4	41.3	47.8	39.2	57.6
Machinery	5.8	13.1	9.5	9.8	36.2	15.0	38.7	11.2	14.2	11.3	10.3	11.9	8.9
Other Industries	6.3	3.7	5.7	9.1	7.4	4.5	28.3	23.4	20.6	21.2	16.3	12.7	13.1
Total	18.8	18.9	18.6	21.2	21.7	18.4	24.7	22.7	21.9	26.6	22.9	24.4	26.3

Table 10: Number of exporting firms by export destination

Row Labels	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PERU	470	492	444	444	431	472	463	472	478	400	402
U.S.A	373	381	381	370	389	436	451	490	441	389	378
ARGENTINA	600	564	548	525	462	360	390	411	400	375	363
MEXICO	187	214	236	242	258	311	330	352	326	341	308
COLOMBIA	207	235	225	219	218	254	275	286	285	273	273
BRAZIL	310	289	261	265	267	256	258	303	303	273	270
ECUADOR	248	276	230	222	251	296	325	305	302	304	267
BOLIVIA	438	436	395	379	340	345	303	301	282	255	232
VENEZUELA	178	196	222	221	221	218	185	209	219	217	213
URUGUAY	288	271	270	252	228	199	187	195	213	194	206
GERMANY	148	161	154	134	132	149	175	192	188	185	184
COSTA RICA	91	96	115	109	118	152	162	178	165	168	179
JAPAN	227	217	196	193	170	185	178	190	184	175	161
CANADA	130	149	111	130	134	143	170	188	204	183	157
CHINA	75	93	82	76	96	119	117	151	154	145	155
SPAIN	123	121	131	115	112	146	171	177	184	152	143
U.K.	117	122	120	117	114	129	119	158	152	147	132
PANAMA	100	105	126	116	117	138	146	136	139	124	125
ITALY	106	108	114	110	106	126	140	146	136	134	124

Figure 6: Percent total value exported and percent number of firms, by major destination

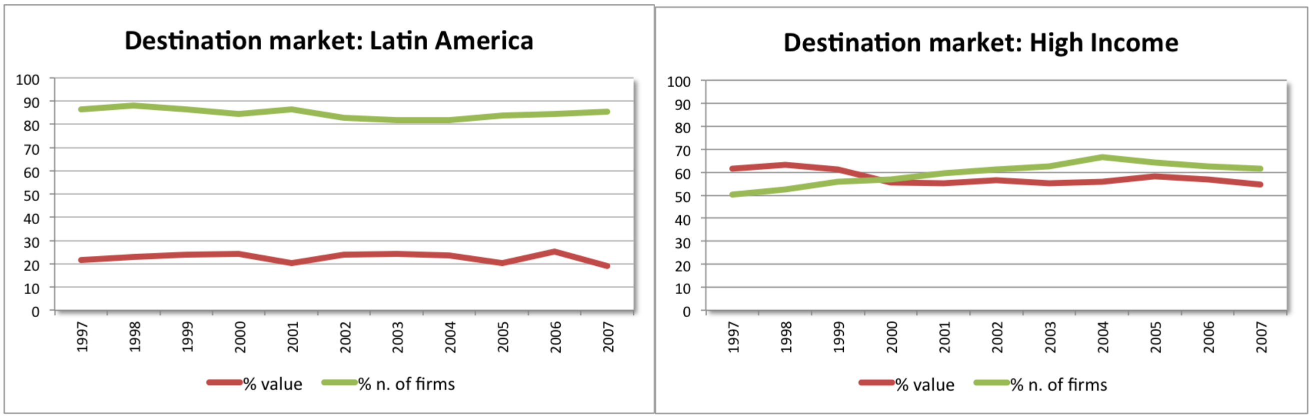


Table 11: Number of export markets served by individual firms

No. of destinations	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	330	329	304	285	281	298	294	285	290	241	222
2	210	174	164	155	155	168	186	169	144	155	134
3	106	113	115	105	103	117	130	142	100	90	93
4	121	95	77	78	85	73	86	79	94	79	54
5	72	69	63	64	61	74	54	62	73	48	53
6	61	60	61	51	41	55	45	51	49	51	50
7	36	40	42	38	37	39	45	37	44	44	42
8	37	34	39	30	34	34	29	41	37	30	23
9	30	38	28	30	31	23	32	33	22	25	23
10	29	35	23	24	29	20	22	27	23	20	33
10<n<20	117	120	126	124	117	135	141	139	132	136	121
>20	54	53	54	60	57	62	70	88	96	86	88

Table 12: Number of 6-digit HS products exported by individual firms

No. of products	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	289	270	265	252	234	251	269	268	254	219	221
2	181	176	170	152	161	169	186	197	189	172	155
3	129	146	124	107	118	134	120	126	136	112	106
4	90	83	83	88	89	87	80	88	79	88	70
5	65	65	63	65	55	65	79	74	69	65	63
6	77	66	42	49	55	58	54	62	55	50	44
7	42	45	46	48	49	49	46	52	40	45	38
8	39	38	50	30	35	39	36	27	31	34	33
9	35	33	26	33	25	28	31	31	31	25	22
10	36	28	41	35	31	34	32	28	25	26	21
10<n<20	132	136	124	120	120	120	130	129	133	113	103
>20	88	74	62	65	59	64	71	71	62	56	60

Figure 7: Number of export markets/6-digit HS products exported by individual firms

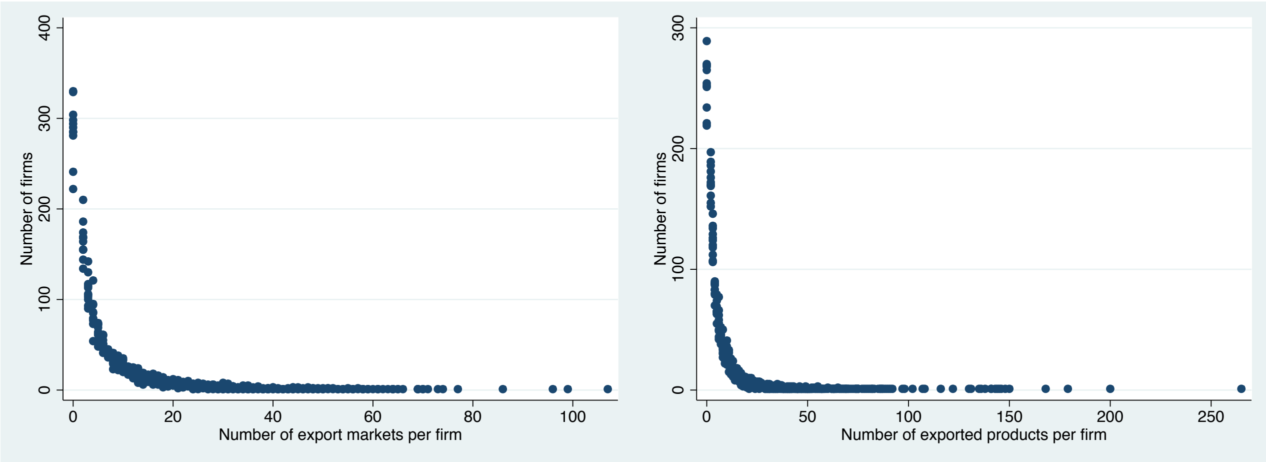


Table 13: Number of export markets/6-digit HS products exported by individual firms

	No. of products						
N. of Markets	1	2	3	3<n<10	10<n<20	>20	Total
1	15.4%	4.8%	2.0%	3.2%	0.6%	0.3%	26.4%
2	3.0%	4.2%	2.6%	4.1%	0.8%	0.3%	15.2%
3	1.5%	1.7%	2.0%	3.7%	0.9%	0.3%	10.1%
3<n<10	2.5%	3.5%	3.2%	13.9%	4.8%	2.1%	30.1%
10<n<20	0.6%	1.0%	0.9%	4.6%	2.7%	1.9%	11.8%
>20	0.2%	0.6%	0.5%	2.3%	1.6%	1.1%	6.4%
Total	23.3%	15.9%	11.4%	31.9%	11.4%	6.1%	100.0%

Table 14: Percentage firms exporting to major destinations

Year	LAC only	HI only	LAC & HI	Other only	Total
1997	47.4	11.2	39.1	2.3	100.0
1998	46.3	10.6	41.9	1.2	100.0
1999	42.1	11.5	44.3	2.1	100.0
2000	39.4	11.7	45.2	3.7	100.0
2001	37.5	10.5	49.0	3.0	100.0
2002	35.9	14.2	46.9	3.0	100.0
2003	33.7	14.5	47.9	3.9	100.0
2004	30.0	14.6	52.0	3.6	100.0
2005	32.1	12.6	51.6	3.7	100.0
2006	34.3	12.6	50.1	3.0	100.0
2007	34.7	10.7	50.9	3.8	100.0
Total	37.8	12.3	47.0	3.0	100.0

Table 15: Production Function Estimation Results

	Total	Food & Beverages	Textiles	Wood	Pulp & Paper	Chemical	Non Metallic	Metallic	Machinery	Other Industries
Skilled labor	0.47	0.34	0.54	0.46	0.42	0.61	0.49	0.50	0.50	0.49
	(88.66)***	(22.00)***	(31.80)***	(16.59)***	(14.77)***	(22.79)***	(9.40)***	(7.86)***	(29.40)***	(6.73)***
Unskilled labor	0.27	0.30	0.31	0.33	0.24	0.19	0.25	0.27	0.31	0.31
	(41.46)***	(18.12)***	(17.66)***	(11.88)***	(12.34)***	(8.12)***	(5.11)***	(4.42)***	(22.25)***	(5.37)***
Capital	0.16	0.18	0.13	0.14	0.17	0.15	0.16	0.20	0.10	0.17
	(18.77)***	(12.67)***	(7.01)***	(5.03)***	(6.26)***	(6.31)***	(3.51)***	(2.86)***	(6.82)***	(2.95)***
N	40,095	11,291	5,677	3,745	2,867	5,658	1,483	786	8,012	576

Note; This table reports the estimated coefficients for value added Cobb-Douglas production function estimations with three factors (capital, skilled labor and unskilled labor) using the method proposed by Levinsohn and Petrin (2003) to correct for simultaneity and selection bias. t-statistics are in parenthesis.

Table 16: Percentage exporters, by decile of log TFP

Decile Log TFP Distr.	Percentage of Exporters	Percentage of LAC Exporters	Percentage of HI Exporters
1	8.3%	5.0%	5.0%
2	8.8%	5.8%	4.9%
3	13.1%	8.3%	7.6%
4	16.7%	11.9%	8.8%
5	20.0%	15.0%	10.1%
6	23.7%	18.0%	12.7%
7	27.3%	21.5%	14.7%
8	31.2%	26.4%	16.6%
9	40.9%	36.1%	24.6%
10	56.9%	50.1%	39.8%

Note: This table reports the percentage of exporters, exporters to Latin American destinations, and exporters to High Income destinations over total firms by decile of logTFP distribution. TFP is calculated at the plant level as a residual of a Cobb-Douglas production function with three factors (capital, skilled labor and unskilled labor) using the method proposed by Levinsohn and Petrin (2003) to correct for simultaneity and selection bias.

Table 17: OLS regression results

VARIABLES	Log Low Skill Empl.		Log High Skill Empl.		Log Low Skill Wage		Log High Skill Wage	
old exporters	1.358***	1.079***	1.371***	1.169***	0.305***	0.140***	0.598***	0.307***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.008)	(0.008)	(0.009)	(0.009)
new exporters	0.863***	0.694***	0.659***	0.565***	0.135***	0.0350***	0.401***	0.217***
	(0.028)	(0.028)	(0.026)	(0.026)	(0.012)	(0.011)	(0.014)	(0.014)
tfp		0.450***		0.385***		0.267***		0.428***
		(0.009)		(0.008)		(0.004)		(0.005)
old exporters HI	1.422***	1.134***	1.442***	1.235***	0.318***	0.146***	0.613***	0.313***
	(0.0210)	(0.0213)	(0.0209)	(0.0211)	(0.00840)	(0.00796)	(0.00969)	(0.00971)
old exporters LAC	0.647***	0.496***	0.539***	0.478***	0.164***	0.0764***	0.424***	0.247***
	(0.0507)	(0.0504)	(0.0486)	(0.0479)	(0.0274)	(0.0248)	(0.0317)	(0.0295)
new exporters HI	1.047***	0.842***	0.804***	0.696***	0.152***	0.0323**	0.454***	0.242***
	(0.0339)	(0.0339)	(0.0321)	(0.0318)	(0.0133)	(0.0126)	(0.0170)	(0.0167)
new exporters LAC	0.514***	0.403***	0.422***	0.334***	0.125***	0.0521**	0.327***	0.178***
	(0.0464)	(0.0481)	(0.0404)	(0.0423)	(0.0236)	(0.0221)	(0.0254)	(0.0251)
tfp		0.446***		0.380***		0.267***		0.427***
		(0.00913)		(0.00796)		(0.00375)		(0.00533)
Observations	41,339	40,201	47,257	40,201	41,339	40,201	47,257	40,201
R-squared	0.255	0.322	0.222	0.303	0.248	0.398	0.304	0.472

Note: The top portion of this table reports the results of a regression of the dependent variable listed in the column on four-digit ISIC sector fixed effects, year fixed effects, and two dummy variables indicating whether the plant is a new exporter or an old exporter. The right column of each outcome adds a control for tfp. An old exporter is defined as a firm that is observed exporting in the first year in the sample (1995) and continue to do so for at least ten years. A new exporter is a firm that begins to export at any point between 1996 and 2006 and sells in international markets for at least two consecutive years. The bottom portion of the table reports the results of a regression of the dependent variable listed in the column on four-digit ISIC sector fixed effects, year fixed effects, and four dummies indicating whether the plant is a new exporter LAC or HI, or an old exporter LAC or HI. Old exporters HI are defined as old exporters that export to a high income destination for at least one year during their exporting life. New exporters HI are defined as new exporters that export to at least one high income country in the year they begin to export. ** denotes significance at the 5% level. *** denotes significance at the 1% level.

Table 18: Probit estimates

Lag TFP	0.173	***	(0.036)
Lag skill ratio	0.028		(0.103)
Lag Employment	0.369	***	(0.028)
Lag Foreign	0.504	***	(0.176)
Textiles	0.241	***	(0.086)
Wood	0.313	***	(0.092)
Pulp & Paper	0.263	**	(0.105)
Chemicals	0.462	***	(0.081)
Non-metallic	-0.154		(0.150)
Metallic	0.484	***	(0.170)
Machinery	0.193	***	(0.076)
Other industries	0.231		(0.241)
Year 1997	-0.002	***	(0.083)
Year 1998	-0.108		(0.090)
Year 1999	-0.407	***	(0.117)
Year 2000	-0.160		(0.104)
Year 2001	-0.120		(0.103)
Year 2002	-0.160		(0.105)
Year 2003	-0.296	***	(0.114)
Year 2004	-0.200	*	(0.104)
Year 2005	-0.265	**	(0.106)
Year 2006	-0.468	***	(0.125)

Note: This table reports the results of a Probit regression of the determinants of starting to export for the total sample. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. Standard errors are in parenthesis.

Table 19: Observable means in treatments and controls before and after matching

	Mean			%reduct	t-test
Variable	Treated	Control	%bias	bias	t p>t
Lag TFP	9.2299	8.7436	60.4		10.77 0.000
	9.2299	9.2519	-2.7	95.5	-0.32 0.748
Lag skill ratio	.15706	.16981	-5.2		-0.84 0.399
	.15706	.14357	5.5	-5.8	0.71 0.476
Lag Employment	4.1988	3.3264	99.8		18.82 0.000
	4.1988	4.2183	-2.2	97.8	-0.24 0.807
Foreign Dummy	.03909	.00496	23.4		8.04 0.000
	.03909	.03583	2.2	90.5	0.21 0.832
Textiles	.13029	.13388	-1.1		-0.18 0.855
	.13029	.13681	-1.9	-81.8	-0.24 0.813
Wood	.11401	.09584	5.9		1.07 0.284
	.11401	.15635	-13.8	-133	-1.53 0.125
Pulp & Paper	.07818	.07355	1.7		0.31 0.758
	.07818	.08795	-3.7	-111.2	-0.44 0.662
Chemicals	.1987	.10171	27.4		5.55 0.000
	.1987	.16938	8.3	69.8	0.94 0.349
Non Metallic	.02932	.04478	-8.2		-1.30 0.193
	.02932	.01629	6.9	15.7	1.08 0.280
Metallic	.02606	.01515	7.7		1.55 0.122
	.02606	.03257	-4.6	40.3	-0.48 0.633
Machinery	.23127	.20783	5.7		1.00 0.316
	.23127	.20521	6.3	-11.2	0.78 0.435
Other Industries	.00977	.01373	-3.7		-0.59 0.554
	.00977	.00326	6	-64.7	1.00 0.317
Year 1997	.14332	.09832	13.8		2.62 0.009
	.14332	.16612	-7	49.3	-0.78 0.436
Year 1998	.11075	.09097	6.6		1.19 0.233
	.11075	.08469	8.7	-31.8	1.09 0.278
Year 1999	.0456	.08515	-16		-2.47 0.013
	.0456	.0456	0	100	0.00 1.000
Year 2000	.07166	.07522	-1.4		-0.23 0.814
	.07166	.07492	-1.2	8.5	-0.15 0.877
Year 2001	.07492	.07183	1.2		0.21 0.835
	.07492	.08795	-5	-321.4	-0.59 0.556
Year 2002	.06515	.07704	-4.6		-0.78 0.437
	.06515	.07166	-2.5	45.2	-0.32 0.750
Year 2003	.04886	.07993	-12.7		-2.00 0.046
	.04886	.05537	-2.7	79	-0.36 0.717
Year 2004	.06515	.08292	-6.8		-1.12 0.262
	.06515	.07492	-3.7	45	-0.47 0.636
Year 2005	.06515	.08459	-7.4		-1.22 0.224
	.06515	.08143	-6.2	16.2	-0.77 0.440
Year 2006	.03909	.07922	-17.1		-2.59 0.010
	.03909	.0456	-2.8	83.8	-0.40 0.689

Figure 8: Covariate imbalance, before and after matching

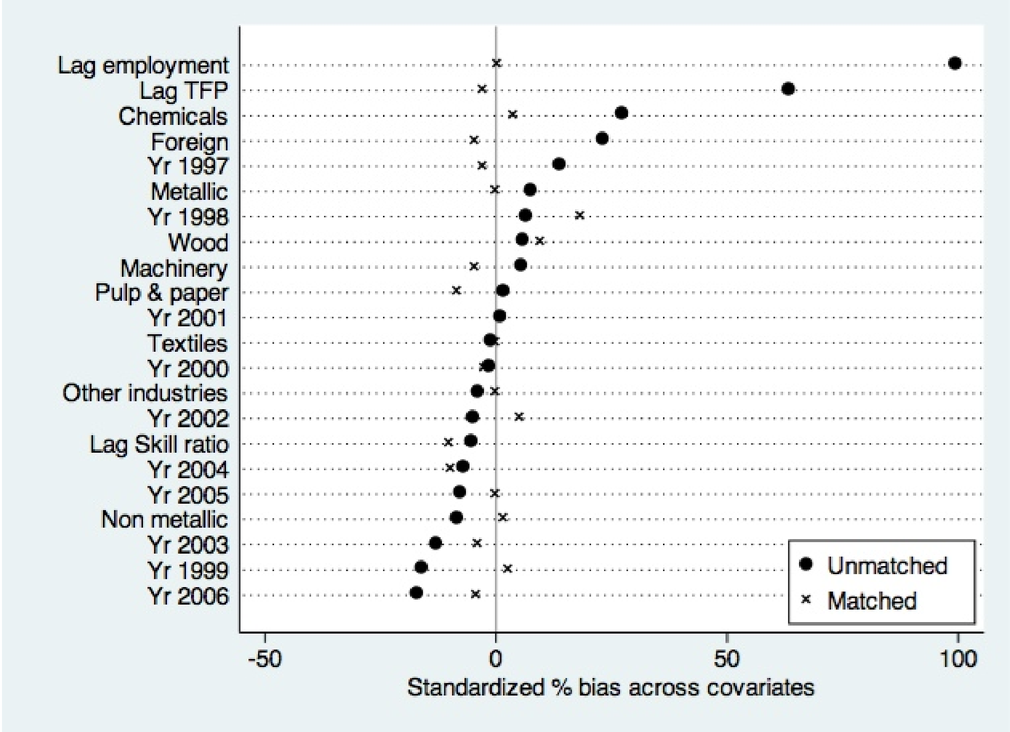


Table 20: Impact of beginning to export on labor market outcomes

Treatment: Starting to export	Outcome: Employment			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.059	0.021	0.114	0.073
Single Difference: Control Group	-0.065	-0.043	0.059	0.071
Double Difference (ATT)	0.125***	0.064	0.055	0.002
	(0.041)	(0.048)	(0.043)	(0.043)
Matched observations (on common support)	614	582	626	620

Treatment: Starting to export	Outcome: Wages			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.037	0.035	0.123	0.033
Single Difference: Control Group	0.049	0.056	0.019	0.018
Double Difference (ATT)	-0.012	-0.021	0.104***	0.015
	(0.030)	(0.030)	(0.033)	(0.034)
Matched observations (on common support)	614	582	626	620

Treatment: Starting to export	Outcome: Sales/Productivity			
	Sales		Productivity	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.138	0.035	0.067	0.015
Single Difference: Control Group	0.013	-0.025	0.024	0.044
Double Difference (ATT)	0.125***	0.060**	0.043	-0.029
	(0.029)	(0.024)	(0.047)	(0.040)
Matched observations (on common support)	628	622	608	576

Table 21: Impact of beginning to export on labor market estimates: triple difference estimates

Treatment: Starting to export	Outcome: Employment (Year 1)			
	Low Skill		High Skill	
	High Cut	Low Cut	High Cut	Low Cut
Double Difference (ATT)	0.216***	0.032	-0.000	0.060
	(0.057)	(0.069)	(0.061)	(0.060)
Triple Difference (DDD)	0.184**		-0.061	
	(0.089)		(0.086)	
Matched observations (on common support)	610		622	

Treatment: Starting to export	Outcome: Wages (Year 1)			
	Low Skill		High Skill	
	High Cut	Low Cut	High Cut	Low Cut
Double Difference (ATT)	0.011	0.027	0.197***	0.081
	(0.045)	(0.043)	(0.049)	(0.055)
Triple difference (DDD)	-0.016		0.116	
	(0.063)		(0.074)	
Matched observations (on common support)	610		622	

Table 22: Impact of beginning to export to Latin American destinations on labor market outcomes

Treatment: Starting to export to LAC dest.	Outcome: Employment			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.034	0.036	0.090	0.082
Single Difference: Control Group	-0.057	-0.026	0.083	0.055
Double Difference (ATT)	0.091	0.063	0.007	0.026
	(0.068)	(0.063)	(0.057)	(0.059)
Matched observations (on common support)	316	294	320	314

Treatment: Starting to export to LAC dest.	Outcome: Wages			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.083	0.044	0.112	0.045
Single Difference: Control Group	0.050	0.071	0.017	0.032
Double Difference (ATT)	0.033	-0.026	0.095*	0.012
	(0.040)	(0.044)	(0.052)	(0.048)
Matched observations (on common support)	316	294	320	314

Treatment: Starting to export to LAC dest.	Outcome: Sales/Productivity			
	Sales		Productivity	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.112	0.020	0.051	0.002
Single Difference: Control Group	0.023	-0.012	0.025	-0.024
Double Difference (ATT)	0.088**	0.033	0.026	0.026
	0.041	(0.033)	(0.058)	(0.049)
Matched observations (on common support)	322	316	314	292

Table 23: Impact of starting to export to high income destinations on labor market outcomes

Treatment: Starting to export to HI dest.	Outcome: Employment			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.087	0.005	0.138	0.063
Single Difference: Control Group	-0.074	-0.060	0.033	0.087
Double Difference (ATT)	0.161***	0.065	0.105*	-0.023
	(0.057)	(0.063)	(0.061)	(0.059)
Matched observations (on common support)	298	288	306	306

Treatment: Starting to export to HI dest.	Outcome: Wages			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	-0.011	0.025	0.133	0.021
Single Difference: Control Group	0.048	0.041	0.021	0.004
Double Difference (ATT)	-0.059	-0.016	0.112**	0.017
	(0.044)	(0.046)	(0.044)	0.047
Matched observations (on common support)	298	288	306	306

Treatment: Starting to export to HI dest.	Outcome: Sales/Productivity			
	Sales		Productivity	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.167	0.050	0.084	0.029
Single Difference: Control Group	0.002	-0.039	0.023	0.115
Double Difference (ATT)	0.165***	0.089***	0.060	-0.085
	(0.040)	(0.030)	(0.070)	(0.060)
Matched observations (on common support)	306	306	294	284

Table 24: Impact of LAC exporters beginning to export in high income destination markets on labor market outcomes

Treatment: LAC exporters entering HI markets	Outcome: Employment			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	-0.087	0.018	0.036	0.045
Single Difference: Control Group	-0.048	-0.051	0.092	-0.066
Double Difference (ATT)	-0.038	0.070	-0.056	0.111**
	(0.069)	(0.067)	(0.066)	(0.055)
Matched observations (on common support)	236	230	244	242

Treatment: LAC exporters entering HI markets	Outcome: Wages			
	Low Skill		High Skill	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.068	0.076	0.015	0.025
Single Difference: Control Group	-0.023	0.054	-0.136	0.098
Double Difference (ATT)	0.092	0.021	0.151***	-0.073
	(0.057)	(0.046)	(0.056)	(0.057)
Matched observations (on common support)	236	230	244	242

Treatment: LAC exporters entering HI markets	Outcome: Sales/Productivity			
	Sales		Productivity	
	Year 1	Year 2	Year 1	Year 2
Single Difference: Treatment Group	0.086	0.007	0.086	0.007
Single Difference: Control Group	0.003	-0.040	0.030	-0.010
Double Difference (ATT)	0.083*	0.048	0.056	0.018
	(0.044)	(0.047)	(0.033)	(0.074)
Matched observations (on common support)	244	242	234	226

Figure 9: Summary results of effects of exporting, by destination

	Labor demand		Wages		Sales/Productivity	
	Unskilled	Skilled	Unskilled	Skilled	Sales	Productivity
enter LAC (new)	0	0	0	9.5% (*)	8.8% (*)	0
enter HI (new)	16.1% (***)	10.5% (*)	0	11.2% (**)	16.5% (***)	0
LAC to HI	0	0	0	15.1% (***)	8.3% (*)	0