Export Destination, Skill Utilization and Skill Premium in Chinese Manufacturing sector

Bilal M. Khan and Junjie Xia

University of Southern California, University of Southern California

15 May 2016

Export Destination, Skill Utilization and Skill Premium in Chinese Manufacturing sector*

Bilal M. Khan† Junjie Xia‡

Abstract

This paper analyzes the link between export destination, skill utilization and skill premium. We identify the mechanism behind these links: the difference in quality valuation of the product across exporting destinations and the distribution of level of skill among the skilled workers in the labor market. Theory suggest that the consumers in the high income countries value the quality of the same product more than their counterparts in middle or low income countries. To produce a higher quality product, a firm needs not only more skilled workers but also higher quality skilled workers. To attract and keep the higher quality worker, firm needs to incentivize her by providing higher wage as compared to the firms that would be exporting to middle or low income countries. We test this theory using cross-section of more than 160,000 single product Chinese Manufacturing firms survey data, of which nearly 22,000 are exporting to more than 200 countries across the world. We find that firms exporting to high income countries pay higher average wages, hire more skilled workers, defined by education level, and pay higher skill premium as compared to firms exporting to middle or low income countries or selling domestically. Similar to the recent literature, we also didn't find the impact of exporting per se on the proportion of skilled workers or the skill premium in the firm.

JEL Classification: F14, F16, J24, L60, O14, O19

Keywords: Trade, Exports, Export destinations, Skill premium, Firm heterogeneity, wages

*We would like to thank Joshua Aizenman, Ayse Imrohoroglu, Jeffrey Nugent, Joel David, Rahul Giri and Rubina Verma for their helpful comments.

†University of Southern California

‡University of Southern California

INTRODUCTION

Much of the traditional literature in International Trade has been focused on the exporting behavior of the firm. It has widely been established that the firms involved in exporting activity are bigger in size, more productive and pay higher wages. Though there has not been much consensus on whether more productive firms self-select into exporting activity (Bernard and Jensen 1995; Clerides, Lach, and Tybout 1998) or whether the exporting activity helps to improve the productivity of the firms by using more efficient technologies for production or hire more skilled workers (Bustos 2011; Matsuyama 2007). In some of the more recent literature, Bastos and Silva (2010), Verhoogen (2008), Manova and Zhang (2012) suggests that the characteristics of the country of destination such as income, distance, transportation costs etc. might describe the firm behavior and its choice of production techniques. Brambila et al. (2012), Brambila and Porto (2016) have established a causal link between the exporting destination and the proportion of skilled workers in the firm whereas Frazer (2013) has established a similar link between the importing destination and the skill utilization at the firm level. In this paper, we elaborate upon the theoretical literature on the export destinations and utilization of skills and also establish a link between the export destination and skill premium being awarded at the firm level using Chinese manufacturing firms data. Using cross-sectional data for 60 countries, Hallak (2006) have shown that the consumers in the richer countries demand higher quality products. Building on this idea introduced by Hallak (2006), Verhoogen (2008) has developed a model linking trade and wage inequality in developing countries. He has shown that exporting allows the firms to upgrade their product's quality. In order to produce higher quality products, firms attract better quality labor by paying them higher wages. Because of this quality upgrading, it leads to higher wage inequality in exporting firms and non-exporting firms within the industry. Matsuyama (2007) have found some other channel for impact of export destination on the proportion of skilled workers in the firm. Matsuyma (2007) proposed a "skill biased globalization" model where exporting behavior requires tasks that are more skill intensive in nature. These tasks are related to marketing the products in the international markets which require workers who are more familiar with the international business practices, can communicate with the foreign customers in their language and are careful about the intricacies of the foreign culture. All these activities require proportionally more skilled workers than the firm that is selling domestically. Building on Verhoogen (2008) and Matsuyama (2007), Brambilla et al. (2012)

have explores the link between the export destination of the firms and the proportion of skilled workers hired by the firm. Their intuition is that consumers in higher income countries demand higher quality products as they value high quality products more than the consumers in low income countries i.e. their marginal valuation on income is relatively low. To produce higher quality products, firm need to hire proportionally more skilled workers. Using the manufacturing firms data for Argentina, they have found that the exporting to higher income countries matter, but exporting per se does not. Firms that tend to export more to high income countries use more skills and as a result pay higher average wages compared to the firms that export to middle-income or low-income countries. They have used average wage per worker and proportion of non-production workers as a measure of skill intensity for the firms. In another paper by Brambilla & Porto (2016), they have established a link between the income level of the export destination and the level of average wages in the exporting country across the world. They have found a robust evidence, worldwide, that the industries exporting their product to high income destination pay higher wages to their workers. Using instrumental variable approach, they have shown a causal link for this phenomenon. They have shown that the consumers in high income destination demand higher quality products and provision of higher quality is costly and requires more intensive use of higher waged skilled labor. Hence, the production of higher quality products at the industry level creates wage premium. They have used the data for 82 countries from 1990-2000. They have dis-aggregated the data into 28 manufacturing sectors.

Similar to Brambila et al. (2012), Frazer(2013) have explored the link between imports, import destination and the skill utilization for firms in Rwanda. He found that the importers in general and the ones importing materials from richer countries in particular pay higher wages (and consequentially, utilizes more skills). Though, nearly all of the above mentioned papers relating to skill utilization use a crude definition of skilled workers. In Brambila et al. (2012) and Frazer (2013), they interpreted higher average wage or the share of non-production workers to be the proxy for higher utilization of skills in the firm.

Building on the work of Brambila et al. (2012), we are exploring whether the provision of higher quality goods just require more intensive use of skilled workers or it also requires higher quality skilled workers. Our intuition is that to produce higher quality products, the firm not only need proportionally more skilled workers but they also require higher quality skilled workers. To

test our hypothesis, we are using a cross-section of annual Chinese manufacturing firms data for 2004. It has detailed information about the firm including sales, exports, number of workers, wage bill, capital ownership etc. and match it with the monthly customs data where information regarding every export or import activity by these firms is recorded by the custom authorities. In addition, we also have the data related to distribution of workers by education level for these manufacturing firms. After carefully matching these data-sets, we have found a statistically significant relationship between export destination, skill utilization and skill premium at the firm level. The availability of the data regarding distribution of education among the workers helps us to cleanly define the measure for skills in the firm and analyze its relation to exporting destination.

Rest of the paper is organized as follows. The next section will discuss the basic economic intuition for this paper and develops a model to describe a link between export destination and the skill premium in the firm setting. In section 2, we would discuss the data and section 3 would outline the empirical strategy employed to test the results of the model.

Model

In this section, we will develop partial equilibrium model analyzing the link between export destination and the level of skill premium. On demand side, we assume that the products are differentiated horizontally as well as vertically. The preferences are non-homothetic in order to capture the idea that consumers in high income countries value high quality goods more than consumers in low income countries. For simplicity, we would use a representative consumer for each country. We are adopting the multi-nomial logit model as introduced by Verhoogen (2008). The customers in the high income country has lower marginal utility of income and are willing to pay higher price for the same quality good as compared to their counterparts in low income countries. The consumer i in country c has the following utility by consuming product j of quality θ, a price p and a random deviation following type-I extreme value distribution, ϵ_{ij}^c as

$$\mathrm{U}_{ij}^c = \theta_j^c - \alpha^c p_{ij}^c + \epsilon_{ij}^c$$

Using these assumptions, we will get the following demand function for the product j

$$x_j^c(p_j^c, \theta_j^c) = \frac{M^c}{W^c} e^{(\theta_j^c - \alpha^c p_j^c)}$$

where M^c is the number of consumers in country c and W^c is an index that summarizes the characteristics of all products available in country c (i.e. $W^c = \Sigma_{z \epsilon Z^c} e^{(\theta_z^c - \alpha^c p_z^c)}$) given Z^c defines the set of available products.

Implicitly, we notice that the $\frac{e^{(\theta_j^c - \alpha^c p_j^c)}}{W^c}$ is the probability of choosing the product j of quality θ by a representative consumer in country c and we multiply it with the number of consumers in country c to find out the expected demand for firm j product. α^c measures the marginal utility of income, or as per Verhoogen (2008), $\frac{1}{\alpha^c}$ measures the quality valuation in country c. α^c will determine the relationship between θ and p in the consumer's utility function. Higher the level of per capita income in country c, lower will be the marginal valuation of income and hence, consumers will be willing to pay more for the same quality product as compared to the consumers in lower income countries.

On the supply side, there are J monopolistically competitive firms in the source country. Each firm produces a differentiated product and can export it to multiple destinations or sell domestically. The firm can also choose a different quality of it's product for different exporting destinations, based on the quality valuation in destination countries. We are assuming that the output can be produced by using labor only. The firm j, in source country, can produce the variety of the quality for it's product as follows:

$$\theta_j = (\frac{b_j}{a_j + b_j})(\frac{A}{1+e^{-s}})$$

Here a_j and b_j are the unskilled workers and skilled workers in the firms respectively. In the above production of quality θ, we notice to produce higher quality, firm not only needs more skilled workers, but also of higher quality i.e. the workers are heterogeneous in their level of skill as introduced by Yeaple(2005). We assume that all unskilled workers in the economy are identical and receives a wage of $\$1$ whereas s is the level of skill of the skilled workers over $(-\infty, \infty)$. For current purposes, we can assume the level of skill is uniformly distributed among the skilled workers. The higher is the value of s, higher is the quality of the skilled worker. For $s \, \epsilon(-\infty, \infty), \theta$ takes the value between 0 and A. A is the upper level of the quality of the product.

Now, since the skilled workers vary by quality, we also define the compensation of the skilled workers as function of s. The skilled worker's wage of quality s is given by $(1 + \frac{K}{1+e^{-s}})$ i.e. $\frac{K}{1+e^{-s}}$

is the premium that the skilled worker of quality s gets over and above the unskilled worker.

Given the above assumptions, a monopolistically competitive firm, producing product j of quality θ and selling it to consumers in country c at a price p, would maximize the profit as:

$$Max_{p_j^c,s,b_j} \qquad \pi_j^c = [p_j^c - a_j - b_j(1 + \tfrac{K}{1+e^{-s}})]x_j^c(p_j^c, \theta_j^c) - F^c$$

or

$$Max_{p_j^c,s,b_j} \qquad \pi_j^c = [p_j^c - a_j - b_j(1 + \tfrac{K}{1+e^{-s}})]e^{(\theta_j^c - \alpha^c p_j^c)}\tfrac{M^c}{W^c} - F^c$$

For the firm j in the source country, M^c and W^c will be exogenous. F^c is the fixed cost of exporting to country c. It can be thought of as transportation costs, or other regulatory costs involved in exporting to country c.

The first order conditions for the above maximization problem would be:

$$p_j^c : \qquad e^{(\theta_j^c - \alpha^c p_j^c)}(1 - \alpha^c p_j^c + \alpha^c a_j + \alpha^c b_j(1 + \frac{K}{1+e^{-s}})) = 0 \tag{1}$$

$$b_j : \frac{e^{(\theta_j^c - \alpha^c p_j^c)}}{1+e^{-s}}[\frac{Aa_j p_j^c}{(a_j+b_j)^2} - \frac{Aa_j^2}{(a_j+b_j)^2} - (1 + K + e^{-s}) - \frac{Aa_j b_j(1+K+e^{-s})}{(a_j+b_j)^2)(1+e^{-s})}] = 0 \tag{2}$$

$$s : \frac{e^{(\theta_j^c - \alpha^c p_j^c)}e^{-s}}{(1+e^{-s})^2}[\frac{p_j^c A b_j}{(a_j+b_j)} - \frac{Aa_j b_j}{(a_j+b_j)} - b_j K - \frac{Ab_j^2(1+K+e^{-s})}{(a_j+b_j)(1+e^{-s})}] = 0 \tag{3}$$

Now, from FOC of the price, we would have

$$p_j^c = a_j + b_j(\frac{1+K+e^{-s}}{1+e^{-s}}) + \frac{1}{\alpha^c} \tag{4}$$

First we put this equation of price into the FOC for s, we would get

$$[(a_j + b_j(\frac{1+K+e^{-s}}{1+e^{-s}}) + \frac{1}{\alpha^c})\frac{Ab_j}{(a_j+b_j)} - \frac{Aa_j b_j}{(a_j+b_j)} - b_j K - \frac{Ab_j^2(1+K+e^{-s})}{(a_j+b_j)(1+e^{-s})}] = 0$$

(5)

After simplifying, we would get

$$b_j^* = \frac{A}{\alpha^c K} - a_j$$

Similarly, now we put the value of p_j^c and above found b into the FOC for b, we would have

$$[(a_j + b_j(\frac{1+K+e^{-s}}{1+e^{-s}}) + \frac{1}{\alpha^c})\frac{Aa_j}{(a_j+b_j)^2} - \frac{Aa_j^2}{(a_j+b_j)^2} - (1+K+e^{-s}) - \frac{Aa_jb_j(1+K+e^{-s})}{(a_j+b_j)^2)(1+e^{-s})}] = 0$$

(6)

After simplifying, we would get

$$1 + K + e^{-s} = \frac{a_j \alpha^c K^2}{A}$$

From the above, it is clear that α^c is inversely related with the level of skill s of the skilled the worker. Now replacing $1 + e^{-s}$ and b_j into the first order condition for the price, we would get

$$p_j^c = a_j + (\frac{A}{\alpha^c K} - a_j)(1 + \frac{K}{(\frac{a_j \alpha^c K^2}{A} - K)}) + \frac{1}{\alpha^c}$$

Data

For this paper we are using balance sheet data for Chinese Manufacturing firms from the Annual Survey of Industrial Firms (ASIF) conducted by China's National Bureau of Statistics(NBS) for 2004. ASIF cover all firms with sales above 5 million RMB during the survey year. There are multi-product as well as single product firms in this data. The relevant information from this data-set for this paper is the firm name, total sales, total capital, total fixed assets, total employment, total wage bill and total exports. Using the Capital ownership information, we have also split the firms into state owned and privately owned. In addition to ASIF, for trade related data, we are using the comprehensive data-set provided by the General Administration of the Chinese Customs, known

as Chinese Customs Trade Statistics (CCTS) for 2004. Customs data report the firm name, firm code, value of firm-level exports and imports, export or import destination at the monthly level. We first aggregate the Customs data to the annual level and then match it with ASIF.

In addition, for ASIF, we have the data about the number of employees with level of education. For example, in firm X, we know how many workers are with middle school, high school, technical diploma, bachelors and postgraduate degree. Contrary to Brambilla et al., we use education level to split the workers into skilled and unskilled workers. We have defined the workers to have less than high school education to be unskilled workers and the ones having education more than or equal to high school be considered as skilled. We have also tried defining high school and less than high school as unskilled and more than high school as skilled workers.

We matched these 3 data-sets using firm id and firm name. For the time being, we are just looking at the single product firms as in case of multi-product firms, we cannot identify how much of the labor is assigned to what product in the firm. After dropping multi-product firms from the data, we are still left with nearly 22,000 exporting firms and nearly 140,000 non-exporting firms. These firms are distributed over 524 industries at 4 digit level and across 399 cities in China. Among these, 471 industries and 311 cities have atleast one exporting firm.

We split the countries into high income, middle income and low income countries using 2004 income per capita range as listed by World Bank. Countries having per capita income to be higher than $9000 in 2004 are considered to be the high income countries.

Empirical Results

We start by stating the summary statistics for the Chinese manufacturing sector in 2004. We notice that, on average, exporting firms are bigger by sales as well as employment, pay higher average wages and have about the same assets per worker as the non-exporting firms. As the data is about the manufacturing firms in China, we notice that more than half of the workers are unskilled as defined by the level of education. For the exporting firms, nearly two-third of the exports are directed towards the high income countries.

Table 1: Summary Statistics

All Firms	
Total No. of Firms	162,862
No. of Exporting Firms	21,977
Average Proportion of Skilled workers	0.435
Average Proportion of workers with high school degree	0.32
Average Proportion of workers with diploma	0.08
Average Proportion of workers with Bachelors degree	0.029
Average Proportion of workers with Masters degree	0.002
Average Assets per worker	281,000 RMB
Average wage per worker	9,456 RMB
Average employees per firm	250
State Owned firms	0.41
Average Sales	46.66 Millon RMB
Exporting Firms only	
Average exports/sales	0.64
Average proportion of Exports to HI	0.68
Average Assets per worker	279, 609 RMB
Average wage per worker	10,599 RMB
Average employees per firm	555
Average Sales	104.85 Million RMB
Average number of destinations per firm	21

Here is the list of variables that we would use for our empirical analysis.

Avg_wage: Log of Average wage per worker

EXP: Export to Sales ratio for the firm. It captures the Export intensity of the firm

HI: Proportion of total exports that goes to high income countries.

$SKILL$: Proportion of skilled workers in the firm. We define skilled workers as education of high school and above.

HS: Proportion of workers with the high school degree.

$Diploma$: Proportion of workers with technical diploma.

BS: Proportion of workers with Bachelors' degree.

MS: Proportion of workers with Masters degree.

AGE: Age of the firm

Cap: Log of Total fixed Assets per worker

$HI * Y$: Interaction term for HI and Y where Y can be $SKILL, HS, Diploma, BS$ or MS.

$STATE$: Dummy variable for state owned or not.

LI: Labor Intensity

PE: Pure Exporter Dummy

We start by running following regression similar to Brambilla's paper. Initially, we define the skilled workers to be ones with high school or more than high school level of education.

$$SKILL = \beta_0 + \beta_1 HI + \beta_2 EXP + \beta_3 .X + \epsilon$$

Table 2

where X includes the interaction dummies for dummies for city and 4 digit industry code. For all the regressions in this paper, we will be controlling the fixed effects at the interaction of 4 digit industry and city level. That creates more than 30,000 cells for industry-city effect. In addition, we are are clustering the errors at 4 digit industry-city level.

We notice that the export destination positively affects the proportion of skilled workers and is significant. However, contrary to the literature, the coefficient for export intensity is negative and significant.

Now, we would add some extra controls including age of firm, age squared, assets per employee and a dummy for State owned firm. We would run the same regression as above but different definition of X.

Table 3

where X further includes AGE, AGE squared, Cap, STATE, in addition to the above. We find the similar results as above i.e. positive and significant effect of high income exporting destination and negative and significant effect of exporting activity on proportion of skilled workers.

In order to address this negative impact of exporting behavior on the proportion of skilled workers, we need to be careful in interpreting these results for China. Lu (2010) have shown that, specifically for China, once we split the exporters into labor intensive and capital intensive category, the exporters in labor intensive sector are less productive than the firms which are only selling into the domestic market. In order to capture this feature, we introduced a measure of labor

intensity in our analysis. We defined the labor intensity as ratio of wage to the value addition in the firm i.e. if the higher proportion of the value addition goes back to the labor, such a firm would be more labor intensive.

Similarly, Dai et al(2011), have shown that the firms which are involved in the processing trade in China are also comparatively less productive. Processing trade firms are those ones that import nearly all of the inputs from abroad, assemble it in Chinese Export Processing zones and ship all of their output to the rest of the world. In order to capture these types of firms, we will use two variables to define a dummy for processing trade firms and non-processing trade firms. First, we will use pure exporting firm dummy i.e. the firms who ship all of their output abroad and don't sell anything in China. The intuition is that the processing trade firms will be exporting all of their output the foreign firms for which they are processing the exports. Once we account for these two effects, we notice that the coefficient of the export intensity hover around zero and it doesn't remain significant. Brambila et al., also didn't find significant effect of exporting behavior on the proportion of skilled workers in the firm. As found by Lu (2010) and Dai et al. (2011), we also find significantly negative coefficient for labor intensity and pure exporter dummy i.e. more labor intensive firms as well a firms involved in processing trade hire less proportion of skilled workers.

Table 4

Now, let's analyze the impact of export destination on the skill premium in the firm. We will first run the regression using the definition of skilled workers as used above. Later, we would split the skilled workers into five categories defined by their education level. Then, we explore the impact of export destination on extra premium for each category of education for skilled workers.

Now to test our main hypothesis of the paper, we will run the following regression to estimate the impact of export destination on the skill premium in the firm.

$$Avg\_wage = \beta_0 + \beta_1 SKILL + \beta_2 HI + \beta_3 HI * SKILL + \beta_4 EXP + \beta_5 .X + \epsilon$$

Following are the results for this regression. Here X has interaction dummies for city and the industry code as mentioned above. β_3 will capture the additional premium being awarded to the skilled workers as a result of exporting to high income destinations. As above, we find a significant and negative impact of export intensity on the average wage as well.

Table 5

Now, we add more controls (i.e. Age, $Age\_squared$, Cap, $STATE$) to X as above and get the following results.

Table 6

In addition, we would also add LI and PE to control for the labor intensive firm and processing trade firm.

Table 7

We notice a positive and significant coefficient for $HI * SKILL$ which shows that the firms that export to high income destinations do pay an extra premium to their skilled workers. As above, once we control for labor intensive industry and whether the exporting firm is involved in processing trade or general trade, we don't find any significant impact of export intensity on average wages in the firm.

Now, let's dis-aggregate the skilled workers into their education groups and analyze the impact of export destination on skill premium for each category.

Table 8

Table 9

Table 10

We notice the same results for the 5 sub-categories of skill as well. We notice that every educational category has an extra premium for exporting to high income destinations. It is positive and significant. In addition, we also notice that all the educational categories have a skill premium over unskilled worker. Ge and Yang (2012) have found that the premium for a college degree have been the highest and is continuously rising over time. For our cross-sectional analysis, we also found the highest premium be for the college degree in the firm.

In addition, we notice that the State dummy has also positive and significant affect on proportion of skilled workers as well as average wage. It seems like the state owned firms hire higher

proportion of skilled workers and also pay higher wages on average. We also find significantly negative effect of pure exporting dummy (i.e. firm involved in processing trade). However, we found significantly positive coefficient for labor intensity.

The above results supports our theoretical results where we found the inverse relationship between marginal utility of income and the price charged by the firm, proportion of skilled workers as well as skill premium being awarded by the firm.

Conclusion & Discussion

In this paper, we have extended the recent literature analyzing the impact of export/import destination on the firm activity. We have contributed by developing a theoretical model linking the export destination to the level of skill premium awarded at the firm level and empirically testing this theory using this huge cross-section of Chinese manufacturing firms data. We have found significant and positive effect of export destination on proportion of skilled workers in the firm and the skill premium being offered by the firm. It is the first paper establishing a link between export destination and the skill premium at the firm level. In addition, in line with the recent literature, we couldn't find any significant impact of exporting activity on either proportion of skilled workers as well as skill premium. It is also the first paper clearly defining the skill level by education at the firm level in the recent trade literature. Much of the work uses the average wage or the share of non-production workers as proxy of skills due to the unavailability of data on the educational distribution in the firm*.

However, to clearly establish the causal link between export destination and the skill premium in the firm, we have to be careful about the endogeneity issue as we have cross-sectional data. All these results establish a correlation between our variable of interests. Having only one observation per firm, we cannot us the firm fixed affects in the analysis. We have used the interacting dummies for 4 digit industry code and the city code, assuming, that the firms in the same city and industry code would be similar. The results still hold even after controlling at such detailed level. †

*This statement is true to the best of our knowledge.

†It is currently work in progress and we are working on finding suitable instrument for our analysis. We have used couple of instruments so far and the results still hold for the skill premium at the firm level, though, these are weak instruments in nature.

Tables

Table 2: Dep = SKILL

Variable	**Coefficient**	**(Std. Err.)**
HI	0.070**	(0.006)
EXP	-0.024**	(0.007)
Intercept	0.420**	(0.001)
N	144217	
R^2	0.436	
$F_{(2,31656)}$	59.698	

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 3: Dep = SKILL

Variable	**Coefficient**	**(Std. Err.)**
HI	0.049**	(0.006)
EXP	-0.018**	(0.006)
AGE	-0.003**	(0.000)
AGE Squared	0.000**	(0.000)
Cap	0.069**	(0.001)
STATE	0.008**	(0.002)
Intercept	0.096**	(0.006)
N	144199	
R^2	0.47	
$F_{(6,31653)}$	602.755	

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 4: Dep = SKILL

Variable	**Coefficient**	**(Std. Err.)**
HI	0.069**	(0.006)
EXP	0.008	(0.007)
AGE	-0.003**	(0.000)
AGE Squared	0.000**	(0.000)
STATE	0.014**	(0.002)
LI	-0.099**	(0.005)
PE	-0.043**	(0.007)
Intercept	0.458**	(0.002)

N	144201
R^2	0.441
$F_{(7,31653)}$	110.209

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 5: Dep = Avg_wage

Variable	**Coefficient**	**(Std. Err.)**
SKILL	0.260**	(0.009)
HI	0.060**	(0.016)
EXP	-0.015	(0.013)
HI*SKILL	0.279**	(0.028)
Intercept	1.900**	(0.004)

N	144217
R^2	0.501
$F_{(4,31656)}$	348.876

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 6: Dep = Avg_wage

Variable	Coefficient	(Std. Err.)
SKILL	0.186**	(0.009)
HI	0.049**	(0.016)
EXP	-0.012	(0.013)
HI*SKILL	0.240**	(0.026)
AGE	0.002**	(0.000)
AGE Squared	0.000*	(0.000)
Cap	0.094**	(0.003)
STATE	0.011**	(0.004)
Intercept	1.458**	(0.015)

N	144199
R^2	0.515
$F_{(8,31653)}$	280.671

Significance levels : † : 10% * : 5% ** : 1%

Table 7: Dep = Avg_wage

Variable	Coefficient	(Std. Err.)
SKILL	0.278**	(0.009)
HI	0.042*	(0.016)
EXP	0.004	(0.014)
HI*SKILL	0.295**	(0.028)
AGE	0.001*	(0.000)
AGE Squared	0.000*	(0.000)
STATE	0.018**	(0.004)
LI	0.364**	(0.012)
PE	-0.062**	(0.013)
Intercept	1.782**	(0.006)

N	144201
R^2	0.511
$F_{(9,31653)}$	284.431

Significance levels : † : 10% * : 5% ** : 1%

Table 8: Dep = Avg_wage

Variable	Coefficient	(Std. Err.)
HI	0.057**	(0.016)
MS	0.623**	(0.177)
BS	1.093**	(0.052)
Diploma	0.533**	(0.028)
HS	0.107**	(0.010)
HI*MS	1.197†	(0.649)
HI*BS	1.291**	(0.186)
HI*Diploma	0.310**	(0.102)
HI*HS	0.102**	(0.033)
EXP	-0.001	(0.013)
Intercept	1.905**	(0.004)
N	144217	
R^2	0.514	
$F_{(10,31656)}$	228.218	

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 9: Dep = Avg_wage

Variable	Coefficient	(Std. Err.)
HI	0.049**	(0.016)
MS	0.505**	(0.174)
BS	0.901**	(0.051)
Diploma	0.408**	(0.027)
HS	0.076**	(0.010)
HI*MS	1.081†	(0.650)
HI*BS	1.184**	(0.180)
HI*Diploma	0.285**	(0.097)
HI*HS	0.081**	(0.031)
EXP	-0.001	(0.013)
AGE	0.002**	(0.000)
AGE Squared	0.000**	(0.000)
Cap	0.078**	(0.003)
STATE	0.011**	(0.004)
Intercept	1.528**	(0.015)
N	144199	
R^2	0.523	
$F_{(14,31653)}$	215.227	

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 10: Dep = Avg_wage

Variable	**Coefficient**	**(Std. Err.)**
HI	0.037*	(0.016)
MS	0.666**	(0.177)
BS	1.151**	(0.051)
Diploma	0.578**	(0.028)
HS	0.117**	(0.010)
HI*MS	1.203†	(0.625)
HI*BS	1.348**	(0.184)
HI*Diploma	0.337**	(0.102)
HI*HS	0.112**	(0.032)
EXP	0.015	(0.014)
AGE	0.002**	(0.000)
AGE Squared	0.000**	(0.000)
STATE	0.016**	(0.004)
LI	0.389**	(0.012)
PE	-0.059**	(0.013)
Intercept	1.776**	(0.006)

N	144201
R^2	0.525
$F_{(15,31653)}$	247.496

Significance levels : † : 10% * : 5% ** : 1%

Bibliography

Bastos, Paulo, and Joana Silva. 2010. "The Quality of a Firm's Exports: Where You Export to Matters." *Journal of International Economics* 82 (2): 99-111.

Bernard, Andrew B., and J. Bradford Jensen. 1995. "Exporters, Jobs, and Wages in U S Manufacturing: 1976-1987." *Brookings Papers on Economic Activity:* 67- 112.

Brambilla, I. D. Lederman, and G. Porto. 2012. "Exports, Export Destinations and Skills," *American Economic Review*, Vol. 102, No. 7, pp. 3406-3438.

Brambilla, I. and G. Porto. 2016. "High Income Export Destinations, quality and wages" *Journal of International Economics*, Vol. 98, No. 7, pp. 21-35.

Bustos, Paula. 2011. "Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms." *American Economic Review* 101(1): 304-4

Clerides, Sofronis K. , Saul Lach, and James R. Tybout. 1998. "Is Learning by Exporting Important? Micro-dynamic Evidence from Colombia, Mexico, and Morocco." *Quarterly Journal of Economics* 113 (3): 903-47.

Ge, Suqin and Dennis Tao Yang (2012). "Changes in China's Wage Structure" *mimeo.*

Hallak, Juan Carlos. 2006." Product Quality and the Direction of Trade." *Journal of International Economics* 68 (1): 238-65.

Lu, Dan. 2010. "Exceptional Exporter Performance? Evidence from Chinese Manufacturing Firms." Mimeo, University of Chicago.

Manova, Kalina, and Zhiwei Zhang. 2012."Export Prices across Firms and Destinations." *Quarterly Journal of Economics* 127(1): 379-436.

Matsuyama, Kiminori. 2007." Beyond Icebergs: Towards a Theory of Biased Globalization." *Review of Economic Studies* 74 (1): 237-53.

M Dai, M Maitra, M Yu (2012) "Unexceptional Exporter Performance in China? The role of Processing Trade" *The Role of Processing Trade*

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

Yeaple, Stephen Ross. 2005. "A Simple Model of Firm Heterogeneity, International Trade, and Wages." *Journal of International Economics* 65 (1): 1-20.