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Irene Brambilla
Rafael Dix Carneiro
Daniel Lederman
Guido Porto

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ABSTRACT

The returns to schooling or the skill premium is a key parameter in various literatures, including globalization and inequality and international migration. This paper explores the skill premium and its link to exports in Latin America, thus linking the skill premium to the emerging literature on the structure of trade and development. Using data on employment and wages for over five million workers in sixteen Latin American economies, the authors estimate national and industry-specific skill premiums and study some of their determinants. The evidence suggests that both country and industry characteristics are important in explaining skill premiums. The analysis also suggests that the incidence of exports within industries, the average income per capita within countries, and the relative abundance of skilled workers are related to the underlying industry and country characteristics that explain skill premiums. In particular, higher sectoral exports are positively linked with the skill premium at the industry level, a result that supports recent trade models linking exports with wages and the demand for skills.

Irene Brambilla
Calle 6 entre 47 y 48
Departamento de Economía
Universidad Nacional de La Plata
Argentina
and Universidad de San Andrés (UdeSA)
and also NBER
irene.brambilla@econo.unlp.edu.ar

Rafael Dix Carneiro
Fisher Hall - Dept of Economics
Princeton University
Princeton, NJ 08540
rdc@princeton.edu

Daniel Lederman
The World Bank
1818 H Street NW
MSN I-8-801
Washington, DC 20433
DLederman@worldbank.org

Guido Porto
Calle 6 entre 47 y 48
Departamento de Economía
Universidad Nacional de La Plata
Argentina
guido.porto@depeco.econo.unlp.edu.ar

1 Introduction

This paper investigates the skill premium in Latin America and the Caribbean. Estimates of the effect of additional years of education on wages—the skilled-wage premium—are often interpreted as a measure of the returns to schooling and of the private benefits of education, which tend to be lower than the social or aggregate returns to education (Krueger and Lindahl, 2001).[1] Bernard and Jensen (1995, 1999) have launched a voluminous literature that documents the better performance of exporting firms vis-à-vis firms that sell in domestic markets. This work, thoroughly reviewed in Bernard, Jensen, Redding and Schott (2007), has established that exporters are larger, are more productive, hire more workers, and pay higher wages.[2] In this paper, we expand this work by investigating the association between exporting and the skill premium.

In the literature on international trade, the skilled-wage premium has been at the center of the work on the link between globalization and the income distribution. In their review of the literature, Goldberg and Pavcnik (2007) highlight the central role played by the returns to schooling parameter insofar as trade-induced skill-biased technical change could be an important channel through which globalization has benefitted skilled workers relative to unskilled workers, thus helping to explain why developing countries experienced increases in income inequality during recent decades.

The skill premium also plays an important role in the literature on international migration and the brain drain (Beine, Docquier and Rapoport, 2001). A central concern in this literature is that the education of workers in developing countries might lead to out migration of skilled workers who seek higher returns to their skills in developed economies. Thus the issue of the so-called brain drain has permeated policy discussions about the developmental consequences of public education policies in poor countries.

In spite of the central role played by the returns to schooling parameter in various litera-

[1] That is, there is little evidence that omitted variables, such as inherent ability or talent (i.e., self-selection of talented individuals into education) have biased estimates of the returns to education (Krueger and Lindahl 2001, p. 1101).

[2] For details, see Bernard and Wagner (1997), Isgut (2001), Bernard and Jensen (2004), Alvarez and Lopez (2005), De Loecker (2007), Schank, Schnabel, and Wagner (2007), Verhoogen (2008), Clerides, Lach, and Tybout (1998), Pavcnik (2002), and Park, Yang, Shi, and Jiang (2008).

tures of importance for developing countries, there has been surprisingly little research about the relative roles played by industrial structure versus national characteristics in developing countries. If skill-wage premiums vary systematically across industries, then industrial policies that favor one sector over another could have important consequences for closing the gap between the private and social returns to education, for reducing the scope of the brain drain due to emigration of highly educated workers, and for affecting the relationship between globalization and income inequality. Hence this paper can also be seen as a contribution to the literature on whether the industrial composition of exports matter for development (e.g., Hausmann, Hwang, and Rodrk 2005).

Our objective in this paper is to explore the industry-skill premium in Latin America and the Caribbean. We work with sixty four household surveys for sixteen countries covering over five million workers in the region. Following the literature on industry wage differentials (Dickens and Katz, 1986; Dickens and Lang, 1988; Gibbons and Katz, 1992), we allow the skill premiums to vary across industries, as in Galiani and Porto (2009).[3] Using the household surveys, we estimate and document the industry-specific skill premiums for sixty industries in each of the sixteen countries in the region.

We then work with those estimates to study econometrically the relationship between the industry-skill premiums and the level of sectoral exports. Brambilla, Lederman, and Porto (2009) review theories to explain a link between exports and the skill premium based on skill-intensive activities associated with exporting. These include marketing activities as well as quality upgrades (labeling, warranties, certification) needed to export. Using firm-level data, the authors find support for such a link. In this paper, we generate additional supportive evidence for models of exports and skills. In cross-country, cross-industry regressions, we find a positive and statistically significant link between the industry-skill premium and the level of sectoral exports. This link, however, is not large in magnitude: doubling sectoral exports (a reasonable shock in our data) is associated with a 0.28 percentage point increase in the manufacturing-industry skill premium.

The related analytical issues have important policy implications. Most countries in Latin

[3]The existence of skill premiums at the industry level requires some sort of labor immobility. In Galiani and Porto, 2009, this is generated by union membership.

America and the Caribbean currently pursue various export-promotion policies, including trade liberalization, export-processing zones, and export promotion agencies. One of the justifications for such policies is the apparent existence of wage premiums for workers employed by firms that sell a large share of their production abroad. If sectoral wage premiums are in fact related to foreign markets, then export-promotion policies could be welfare enhancing. More generally, industry-specific policies, including other forms of industrial policies, could help reduce the gap between the private and social returns to schooling. The evidence reported in this paper can help guide these policy options.

The rest of this paper is organized as follows. Section 2 reports several estimates of average skill premiums for the countries under investigation: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay. To test their robustness, we discuss results from various model specifications that differ in terms of definitions of skilled workers, sub-samples of the data, and econometric estimators. In addition, the analyses in Section 2 assess whether international differences in skill premiums are associated with relative endowments of skilled workers, heterogeneity in the composition of skilled workers, or heterogeneity in gender-specific skill premiums. Section 3 presents estimates of industry-specific skill premiums for 60 tradable and non-tradable sectors covered by the employment survey data, including 23 manufacturing sectors. After a brief analytical discussion of inter-industry wage differentials and the role of exports, Section 4 discusses the empirical analysis of exports as determinants of the skilled premium in manufacturing sectors. Section 5 concludes by summarizing the main findings.

2 Estimation of National Skill Premiums

We start by estimating national wage premiums paid to skilled workers using household-level data from sixteen Latin American economies: Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay. The data include information on wages,

skills, industry affiliation and characteristics of workers from 64 different household surveys. Details of the household surveys, years of data and number of observations are found in Table 1. For each country we have between two (Argentina, Chile, Nicaragua) and seven (Dominican Republic) years of data, ranging from 2000 to 2006, for a total of around 60,000 (Nicaragua) to 1,150,000 (Brazil) observations per country. Adding across countries and years, we have over five million observations.

Table 2 displays descriptive statistics on education and skill levels of the workers. The first two columns show sharp differences in the average number of years of education and in the share of skilled workers (defined as individuals who hold a high school diploma) across countries. Average years of education are comparatively high in Argentina (10.63), Uruguay (9.82), Chile (8.89), Panama (8.81), Colombia (8.53), and Ecuador, the Dominican Republic and Mexico (around 7.9). These countries also show the highest share of skilled workers, ranging from 27 percent in Mexico to 52 percent in Argentina (in Colombia, instead, the share is relatively lower). The lowest years of education are observed in Nicaragua, Guatemala and Honduras (5.31, 5.70, and 5.99) but the lowest share of skilled workers are observed in Nicaragua and Brazil (9 and 13 percent). In the cases of Argentina and Uruguay, the relatively high averages are partly explained by survey design because the surveys cover only urban households. In the other fourteen countries the surveys are representative of the rural as well as urban populations.

Columns 3 and 4 compare male and female workers. For some countries the share of skilled workers is higher among females than among males, most noticeably in Argentina, Brazil, Dominican Republic, Uruguay and Panama. This difference ranges between 4 and 7 percentage points. In contrast, in Colombia, El Salvador, Mexico, Peru and Guatemala the share of skilled workers is between 2 and 6 percentage points higher among males than females.

It is also informative to look at skilled workers at a finer level of disaggregation, as workers of different educational levels are grouped together in the skilled category. Column 5 presents the share of highly-skilled workers conditional on being skilled, that is, the share of workers with more than a high school diploma (individuals with tertiary education, some

college experience, college degree, and graduate degrees) in the total number of workers with at least a high school diploma. This statistic indicates the composition of skilled labor in each country. The differences across countries are again very sharp, thus implying that the composition of the skilled labor force varies across countries. Countries with high shares of highly-skilled workers in the skilled group (41 to 56 percent) are Colombia, Peru, Mexico and Nicaragua. Notice, for instance, that because Nicaragua has the lowest skill share, the relatively few workers with degrees tend to reach a high educational attainment. Countries with low shares of highly-skilled workers are El Salvador, Paraguay, Argentina and Chile (19 to 23 percent). The participation of highly-skilled workers in the total labor force can be obtained by multiplying column 5 by column 2.

To estimate the returns to skill in each country, we pool data from all years and estimate Mincer-type regressions with the log hourly wage of each worker explained by individual worker characteristics. The main variable of interest is a binary variable that indicates whether the worker is skilled or unskilled. The equation takes the following standard form:

$$(1) \quad \ln w_{ijt} = \gamma Sk_{ijt} + \mathbf{x}'_{ijt}\beta + \delta_j + \delta_t + \varepsilon_{ijt},$$

Subscript i denotes individuals, j the industry of employment, and t denotes years. There is a separate equation for each country (country subscripts are dropped). The hourly wage is given by w. It is computed as the reported weekly wage divided by the number of hours worked per week.[4] We define skilled workers as those with a high school diploma or more. Thus, the binary variable Sk is equal to one if the individual has at least a high school diploma. The coefficient γ measures the skill premium, that is, the percentage difference in wages of skilled workers relative to unskilled workers. We control for individual characteristics in the vector $\mathbf{x}$ and for industry and year effects in the indicator variables δ_t and δ_j. The controls included in $\mathbf{x}$ are gender, age and age squared, marital status, whether the individual works full-time or part-time, a dummy for individuals in rural areas, and regional dummies. The estimates from these equations are correlations from cross-sections

[4]In several surveys these data refer to the total wages received and number of hours worked during the week prior to the survey.

of workers, which raises econometric issues that have been discussed at length in the labor literature (see, for example, Griliches 1977, Card 1999, and Krueger and Lindahl 2001). A key concern in this literature is that the estimated correlations capture the ability or talent of workers, which is correlated with both educational attainment and wages, which would yield upwardly biased estimates of the returns to schooling. On the other hand, because wages and educational attainment are reported by the surveyed workers, the estimates might suffer from attenuation bias due to random reporting errors.[5] Therefore, the econometric results should be interpreted as reduced-form coefficients measuring the average difference in wages between skilled and unskilled workers, not as predictions of the wages that would be received by individual workers who enter the skilled-workers category.

In a second specification, we define two groups of skilled workers: semi-skilled workers (those with a high school diploma) and highly-skilled workers (those with tertiary education, some college, a college degree, or a graduate education). In this case we include two binary variables, Sk^1 for the semi-skilled and Sk^2 for the highly-skilled, as shown in the following equation:

$$(2) \quad \ln w_{ijt} = \gamma^1 Sk^1_{ijt} + \gamma^2 Sk^2_{ijt} + \mathbf{x}'_{ijt}\beta + \delta_j + \delta_t + \varepsilon_{ijt},$$

The coefficients γ^1 and γ^2 measure the wage premium for semi-skilled and highly-skilled workers. Both coefficients are defined relative to unskilled workers.

To estimate the returns to skills in equations (1) and (2), we restrict the sample to employed workers (the wage of unemployed workers is zero) between 22 and 65 years of age. We drop employed workers who report a wage of zero. Results are reported in Table 3.

Estimates of equation (1) are presented in column (1) of Table 3. The coefficients are interpreted as the percentage difference in wages between skilled (high school diploma) and unskilled workers. For example, in Ecuador the wage of an employed individual with a

[5]Krueger and Lindahl (2001, p. 1101) conclude in their literature review that there is surprisingly little evidence of ability bias in estimates of the returns to schooling. For our purposes, ability bias is not a serious concern because there is no reason to believe that the magnitude of the ability bias varies across countries. It may vary systematically across industries, which is the focus of sections 3 and 4 below. However, we do want to capture complementarities between unobserved worker ability and skills allocated across sectors.

high school diploma is, on average and after controlling for observable worker characteristics and industry affiliation, 53 percent higher than the wage of an employed unskilled worker. Coefficients range from 38 to 98 percent. Brazil and Colombia show the highest returns to skill—over 90 percent. Countries with returns to skill over 60 percent are Nicaragua, Guatemala, Costa Rica, Honduras, Mexico and Chile. In Paraguay and Ecuador the skill premium is above 50 percent. In the remaining countries—Dominican Republic, Panama, Argentina, El Salvador, Peru and Uruguay—the skill premium ranges from 49 to 38 percent.

Columns (2) and (3) in Table 3 present results from equation (2), where the skill premium is split into the premium for semi-skilled workers and highly-skilled workers. Both premiums are interpreted relative to the unskilled category. Thus, in Costa Rica, semi-skilled workers earn on average 56 percent more than unskilled workers, and highly-skilled individuals earn close to 100 percent more than the unskilled. Across countries, the premium for semi-skilled workers ranges from 24 to 84 percent; the premium for highly-skilled workers ranges from 62 to 116 percent. In general, countries with a high premium for the semi-skilled also exhibit a high premium for the highly-skilled. The correlation between the two measures is 0.76.

The samples used to obtain the results described above include workers in all sectors of the economy and the estimates consequently reveal patterns of skill premiums at the national level. Because section 4 below is about the relationship between industry-specific skill premiums and exports, we also estimated the average skill premium restricting the sample to workers employed in manufacturing sectors only. Our estimates of skill premiums do not differ much from the baseline case where all workers are included in the regressions. To test the robustness of the results, we have also restricted the sample to full time workers only and have also experimented with a median regression, which is theoretically less sensitive to outliers. Again, results are very close to the baseline specification. These results are not shown in Table 3, but are available in Table A1 in the on-line appendix.[6]

Our results uncover considerable differences in the returns to skill across countries. One obvious explanation for the differences in skill premiums could be factor endowments. Comparing the returns to skill presented in column (1) with the skill endowments in Table 2,

[6]The link is `http://sites.google.com/site/guidoportounlp/`.

column (2), we find a negative association between the skill ratio and the skill premium. The correlation between the two variables is –0.64.

Another plausible explanation for the estimated cross-country differences in the average skill premium is gender differences in returns to skill, which could vary across countries as a consequence of cultural attitudes and social norms related to gender. Gender differences in the returns to schooling could also be due to country differences in industrial structure, with some industries employing relatively more (less) female workers with different skill levels. For example, export assembly operations ("maquilas") are known to employ more women than men, and these industries tend to be located in economies that are close to the U.S. market. To explore this possibility, we allow the skill premium to vary by gender by adding an interaction term to the baseline regression:

$$(3) \quad \ln w_{ijt} = \gamma Sk_{ijt} + \widetilde{\gamma} Sk_{ijt} * M_{ijt} + \mathbf{x}'_{ijt}\beta + \delta_j + \delta_t + \varepsilon_{ijt},$$

where M is a binary variable that is equal to one for males (the gender dummy is separately included in $\mathbf{x}$). The skill premium for females is given by γ, while the premium for males is given by $\gamma + \widetilde{\gamma}$, where $\widetilde{\gamma}$ represents the differential skill premium for males. In the case of two skill groups, the regression equation is

$$(4) \quad \ln w_{ijt} = \gamma^1 Sk^1_{ijt} + \widetilde{\gamma}^1 Sk^1_{ijt} * M_{ijt} + \gamma^2 Sk^2_{ijt} + \widetilde{\gamma}^2 Sk^2_{ijt} * M_{ijt} + \mathbf{x}'_{ijt}\beta + \delta_j + \delta_t + \varepsilon_{ijt},$$

where $\widetilde{\gamma}^1$ and $\widetilde{\gamma}^2$ are the differential premiums for semi-skilled and highly-skilled males relative to females.

Results for the differential premiums are displayed in columns (4) to (6) of Table 3. They range from negative 14 percent to positive 15 percent. Countries with a positive differential for males are Brazil, Nicaragua, Costa Rica and Chile. In almost all other countries, with the exception of a few results that are not statistically significant, the male differential is negative and significant, which implies that the gender wage gap is lower among skilled than among unskilled workers. For most countries, splitting skilled workers into semi-skilled and highly-skilled does not affect the direction of the gender difference in skill premiums, but

there are significant international differences in the gender-specific skill premiums.

Because the pattern of these gender-specific premiums is somewhat erratic across countries, our results suggest that the cross-country differences in skill premiums are more likely due to differences in relative factor endowments than to gender differences. Additional support for this conclusion comes from a simplistic regression model with the national skill premium as the dependent variable (and a corresponding sample of sixteen observations) and these two explanatory variables. The results (not reported) show that only the ratio of skilled over unskilled workers is statistically significant with a coefficient estimate of –0.90 and a corresponding p-value for the null hypothesis of 0.02. The male-specific skill premium by country is not statistically significant. In fact, the estimate of the skill endowment variable changes only slightly, to –1.0 (from –0.90) after the exclusion of the gender-specific premium.

Another plausible explanation for the large differences in skill premiums across countries could be the composition of skill groups. Skilled workers are far from homogeneous. In particular, the highly-skilled group includes individuals with tertiary education, some college, a college degree, and a postgraduate degree. Table 4 presents the skill premiums of five groups: individuals who completed elementary school, individuals who did not finish high school, high school graduates, individuals with some college or tertiary education, and college graduates. The results are markedly different across countries even for these arguably more homogeneous groups. Moreover, the average of the five coefficients is highly correlated with the skill premium in that same country (the correlation is 0.72). Thus far, it seems that the skill endowments are our preferred country-level correlate of national skill premiums, but in subsequent exercises (reported in Table 12) we explore the role of the level of development, proxied by GDP per capita.

3 Industry-Specific Skill Premiums

This section explores differences in skill premiums at the industry level. In models with perfect factor mobility, wages equalize across sectors and there should thus be an aggregate skill

premium affecting all skilled workers in the labor market. With departures from that model, including imperfect factor mobility of skilled labor (but also of unskilled labor), wage equalization does not follow, and skill premiums at the industry level can result in equilibrium. To investigate this scenario, we expand our previous model to estimate skill premiums by sector. Specifically, we multiply the skill categories, using the different definitions described above, by dummy variables for each industry code at the 2-digit International Standard Industry Classification (ISIC) Revision 3.[7] The coefficient on this interaction provides an estimate (relative to the industry of reference) of industry-specific skill premiums.

At the 2-digit level, there are 60 sectors in the ISIC Revision 3 classification. With a sample of 16 countries, we estimate approximately 960 industry-skill premiums (which are listed in Table A2 of the on-line Appendix). There are significant differences in the skill premiums, both across sectors for a given country and across countries for a given sector. Table 5 presents the distribution of industry-skill premiums within countries. Consistent with the estimates of the aggregate skill premiums (Table 3), there are wide differences in the average (and median) skill premium across countries that unsurprisingly mimic the patterns observed in Table 3. Figure 1 also illustrates the notable dispersion in the estimated skill premiums across industries within countries.

In addition, there is considerable dispersion in the average skill premium across countries (for a given industry). Table 6 reports the top-10 industries with the highest cross-country average skill premium (average computed across countries for a given industry) and the bottom-10 industries with the lowest cross-country average premiums. The cross-country averages in the skill premium range from 1.12 in sector 99 ("Extra-territorial organization and bodies") to 0.13 in sector 95 ("Private households with employed persons"). Additionally, we construct industry rankings for each country. Columns (3), (4) and (5) report the fraction of countries for which a given industry ranks in the top 50 percent, top 25 percent, and bottom 25 percent. Heterogeneity in the rankings of the skill premiums even within the highest- and lowest-ranked sectors is apparent. For instance, the skill premium in sector 99 (with the highest average) is above the median only in 88 percent of the countries, while for 13

[7] For those surveys that do not use ISIC Rev.3 to classify industries, concordance tables were utilized.

percent of the countries the industry ranks in the bottom 25 percent. In contrast, sector 74 ("Other business activities") has the third-highest average skill premium but the individual skill premiums are above the median in all countries. As another example of heterogeneity, Sector 62 (Air transport) is third from the bottom in cross-country average, and, while it ranks in the bottom 25 percent for 42 percent of countries, it is in the top 25th-percentile for 25 percent of countries.[8]

We also investigated the dispersion of skill premiums (across sectors and countries) for the semi-skilled and highly-skilled categories. Table 7, in Panels A and B, reports cross-sector average premiums for these two groups within each country. There is still significant dispersion in the premiums. For the highly-skilled, for instance, the highest average premium is estimated for Chile (1.23) and the lowest for Uruguay (0.64). For the semi-skilled, the highest premium appears in Brazil (0.88) and the lowest in Peru (0.27) and Uruguay (0.24).

To examine the pattern of skill premiums across countries, Table 8 reports average premiums for the highly-skilled for each sector across countries, but similar conclusions can be drawn for the semi-skilled. Panel A displays the top-10 sectors with the highest premiums, which include five sectors that were also top-10 sectors in Table 6 and five others. The highest-ranked sector, for instance, is now "Manufacture of radio, television, and communication equipment." A similar pattern emerges for the bottom-10 sectors with the lowest premiums (always within the highly-skilled). These results reinforce the observation that the skill premiums vary considerably across country and across industries. The following section analyzes potential determinants of industry-specific premiums.

[8]Sectors with consistently high premiums include "Other business activities," "Agriculture and hunting," "Manufacture of other non-metallic mineral products," and "Health and Social Work". Sectors with consistently low premiums are "Hotels and Restaurants," "Land transport, transport via pipelines," and "Private households with employed persons." It is also noteworthy that, in the high-ranked and low-ranked sectors, manufacturing sectors (typically tradable) rank with services and non-tradable sectors.

4 Exports as a Determinant of Industry-Specific Skill Premiums

Skill premiums are affected by numerous factors, including demand and supply conditions, policies, and various shocks. Our interest in the correlates of skill premiums is motivated by the literature on wages paid by exporters relative to non-exporters. This literature, pioneered by Bernard and Jensen (1995, 1999), documented the better performance of exporting firms in terms of employment, wages, and productivity. This work has been complemented and expanded by numerous researchers (see for instance the review in Bernand, Jensen, Redding, and Schott 2007): the superior performance of exporting firms (as well as importing firms) is now clearly established. In a related paper, Brambilla, Lederman and Porto (2009) develop a model of exports and skills tested with firm data from Argentina. The ongoing explores a reduced-form analysis to generate evidence in support of claim that the level of exports is a key determinant of the skill premium.

Two leading theories explain this potential link between industry exports and skill premiums. One argues that the act of exporting requires activities that are skill-intensive, although the production of the good may require unskilled labor. Exporting firms, and therefore industries with more exports in general, will thus demand higher skills and pay a higher skill premium. The alternative theory argues that exporting is associated with higher profits (because more productive firms self select into exports) and these higher profits are shared with the workers via profit sharing rules.

The theory focusing on the need to engage in skill-intensive activities in order to export a product is based on Brambilla, Lederman, and Porto (2009). For our present purposes, we assume that skilled labor is imperfectly mobile, as in Goldberg and Pavcnik (2005), Ferreira et al. (2008), and Galiani and Porto (2009). Unskilled workers are perfectly mobile across sectors and earn the economy-wide competitive wage, w_u. While total labor supply in a given industry may be fixed due to labor specificity, workers can be induced to supply more effort at higher offered wages. In Figure 2, for instance, the relationship between effective skilled labor supply in industry j and skilled wages w_s is increasing (the function $L_s(w_s)$).

Exporting requires both the production of the physical units of the product and the provision of export services. These services include labeling, marketing, technical support, consumer support (webpage, email, warranty).[9] Brambilla, Lederman, and Porto (2009) assume that these export services are skill-intensive activities because they require the effort L_s of highly skilled managers and engineers. It follows that the demand for the effort of skilled labor in industry j will depend on the level of exports of the industry.[10] In Figure 2, we plot two such demand functions for two industries with different levels of exports, $Exp_H > Exp_L$; the high-export industry has a higher demand for skilled workers.

As Figure 2 shows, the high-export sector pays higher wages to their skilled workers. Since the wage offered to the unskilled workers is assumed to be the same across industries (given by the competitive national market for unskilled labor), it follows that high-export sectors pay a higher skilled premium.

An alternative theory is based on profit sharing mechanisms. In the trade literature, profit sharing originates in a fair-wage hypothesis, as in Egger and Kreickemeier (2009) and Amity and Davis (2008). In short, skilled workers demand a wage premium to exert the necessary effort because it is considered fair to share the profits of the firms. In consequence, while marginal firms pay the competitive outside wage, more profitable firms pay increasingly higher wages. In Figure 3, this is represented by the fair-wage constraint $w_s = \phi(\pi)$, where $\phi(\cdot)$ is increasing in the level of profits π.

Profits, on the other hand, are a decreasing function of the wages offered to skilled workers. This is represented by the function $\pi(w_s)$ in Figure 3. In addition, following Melitz (2003), we assume that profits are higher for exporters, and consequently the profit function $\pi(w_s)$ of high export sectors are higher, for a given level of wages, than in low export sectors. In equilibrium, high-export firms offer higher wages w_s to skilled workers. Together with competitive labor markets for unskilled labor with equilibrium wages w_u and some degree of specificity of skilled labor (as before), in the end the industry-specific skill premium is an increasing function of the level of sectoral exports.

[9] In Manasse and Turrini (2001) and Verhoogen (2008), exporting requires quality upgrades.

[10] The demand for unskilled labor may depend on exports. For illustration purposes, this is not really relevant in our discussion. See Brambilla, Lederman, and Porto (2009) for details.

It is worth noting that the theories described above imply that exports either demand higher skills (observed and unobserved, thus including innate worker ability) or offer higher profits, which can be shared with skilled workers. The empirical exercises that follow, however, should not be interpreted strictly as as tests of exports as causing high skill premiums. This would be the case only if exports are strictly exogenous and industry-specific demand for skilled workers does not by itself cause exports. As will become apparent, it is somewhat comforting that the effects of industry-specific exports appear correlated with skill premiums even after controlling for industry-specific effects. Still, the results must be interpreted with caution because it does not follow that skilled workers that move from an industry with low estimated premiums to another with higher premiums will receive higher wages. This is so because industries and exports may require specific skills that may not be transferable to other activities.

4.1 Country and Industry Effects

In the remainder of this section, we exploit our estimates of industry-specific skill premiums for Latin America to provide evidence in support of the claim that they are positively correlated with sectoral exports. As a first step, we assess the role of country and industry dummies. More specifically, the industry-skill premium is explained by i) country dummies alone; ii) industry dummies alone; iii) country and industry dummies. For each of these models, we report in Table 9 the R^2 (adjusted) and the F-test of joint significance of each set of dummies. We do this for all sectors, for the manufacturing sectors, and for the non-tradable (and services sectors).

If we include all sectors, country dummies alone account for 20 percent of the variance of the skill premium while industry dummies alone account for almost 48 percent. Both sets of dummies jointly explain around 69.2 percent of the variation in the industry-skill premium. The dummies are always jointly statistically significant. In this case, it appears that the industry dummies play a more important role than country dummies. It should be kept in mind, however, that the comparison of R^2s is a descriptive assessment of the role of the dummies in explaining the variance of the dependent variable. For reference, Tables 10 and

11 list the estimated dummy-variable coefficients for countries and industries. The omitted categories are agriculture and Argentina.

If the sample is restricted to the manufacturing sector (second panel of Table 9), we see that country dummies and industry dummies are more or less equally important in explaining the dependent variable. As before, both sets of dummies are jointly significant. Finally, when we consider only non-tradable and services sectors (bottom panel of Table 9), the industry dummies appear to be much more relevant than the country dummies. Once again, the two sets of dummies are jointly significant.

4.2 Exports and the Skill Premium

As mentioned, sectoral exports could be an important determinant of the industry-specific skill premiums. To assess this claim, we estimate several versions of the following model:

$$(5) \quad \gamma_{jc} = \alpha \ln\left(\frac{export_{jc}}{gpd_{jc}}\right) + \mathbf{z}'_{jc}\beta + \phi_j + \phi_c + \mu_{jc},$$

where $\mathbf{z}_{jc}$ may include country or industry dummies or both, and characteristics of industry j in country c. The model is estimated with weighted least squares. This GLS strategy accounts for the fact that the industry-specific skill premiums are estimated (in equations (1) or (2)) for instance. The weights are thus the inverse of the standard errors. Notice that we use OLS as the best linear predictor of the regression function and we do not attach any causal relationship to our estimates. In fact, our regression results have a clear reduced-form interpretation to illustrate whether the data support any link between sectoral exports and the sectoral skill premiums.

Table 12 presents the results. Column (1) shows the estimate of the model when the skill premiums are regressed on a constant and the log of the ratio of exports over GDP. The estimate for α is positive and significant, thus suggesting that the skill premium rises with exports. The estimate in column (1) implies that doubling a sector's share of exports over GDP (or a change in the log of exports over GDP equal to one) is associated with an increase of 0.0028 in the skill premium, i.e., the wage differential between skilled and unskilled workers

rises by 0.28 percentage points. Notice that the simulated shock of a change of 1 in the log of exports over GDP is reasonable because the standard deviation of the variable in our sample is about 2.1. Thus this association is positive and significant but it is not very large.

In columns (2) to (5) of Table 12, we perform several robustness tests. Column (2) shows the results from the estimation of (7) with industry dummies. The incidence of industry exports remains significant, with a similar magnitude as in column (1). Column (3) includes country dummies only, and the link between exports and the skill premium disappears. In Column (4), we include both sets of dummies and the link disappears, too. Controlling for both country and industry dummies might be too restrictive, however. Country fixed effects explain about a third of the variation in skill premiums, and both country and industry dummies account for about 60 percent. This leaves little room for exports to explain the skill premium because much of the variation of the dependent variable is attenuated by the dummies. To learn more about the role of sectoral exports, we work with a more parsimonious version of equation (7) where instead of country dummies we control for country characteristics, namely the log of per capita GDP and the ratio of skilled (high school completed) over unskilled labor. These results are reported in column (5) of Table 12. Both per capita GDP and the skill composition are statistically significant determinants of the industry-skill premiums with the expected signs: richer countries seem to have greater disparities between skilled and unskilled wages, and, as expected, countries with a greater fraction (supply) of skilled workers pay smaller skill premiums. The significance of these variables supports their use in lieu of the country fixed effects. Also, the R^2 of the model remains high at 0.46, which is higher than the R^2 from the model with country dummies. In these models, the coefficient of exports as a fraction of GDP is positive and statistically significant (column (5)), and the estimate is of similar magnitude as the one reported in columns (1) and (2).

We finish by studying other trade-related determinants of industry skill premiums. We look at unit values as proxies for product quality. A model of the impact of quality upgrading on wage inequality (or increases in skill premiums) is developed and estimated by Verhoogen (2008). We also assess product variety, measured by the dispersion of unit values within

industries, as a correlate of skill premiums. The argument is that product differentiation may matter. Perhaps firms in sectors with wide scope for product differentiation can exercise monopoly power, charge higher mark-ups, and perhaps pass-on those profits to their workers. Alternatively, product differentiation itself may require skills.

The calculation of unit values using data from the U.N. Comtrade database is not straightforward and inevitably brings measurement errors. We used three different measures for unit values in order to check for the robustness of the results.

First, in Comtrade, many recorded transactions for a single HS code appear with different quantity codes, making comparison between unit values for a single HS code impossible. To address this concern, for a given HS code, we pooled data from all countries and picked the quantity code that is reported more frequently. For the calculation of unit values, we only considered those transactions that were reported in the "most frequent quantity code," to make sure that unit values for a given HS code are expressed in the same units across countries. Unit values are then aggregated at the ISIC Rev 3, 2-digit level by taking weighted averages (weights are given by the importance of a given HS code exports on total exports of the corresponding 2-digit ISIC industry). The measure for the dispersion of unit values is the variance of unit values across HS codes within a country and 2-digit ISIC industry.

Second, unit values are highly dispersed, and therefore we used the median unit values (without any weighting) as a second measure of unit values. The corresponding indicator of dispersion is still the variance of unit values.

Third, to account for outliers we trimmed the top and bottom five percent of the observations on unit values. In turn, we calculated the weighted average within countries and 2-digit ISIC industries as in the first approach.

The regression model is similar to equation (7). That is, we regress the skill premium in industry j and country c on the measures of unit values and the variance of unit values plus industry dummies and national characteristics instead of country dummies, namely the log of per capita GDP and the ratio of skilled to unskilled endowments.[11] Our main results are in Table 13. Each panel in the table corresponds to one of the three indicators of unit

[11] These results are not reported for the sake of brevity.

values.

Our first conclusion is that neither unit values nor the dispersion of unit values explain the industry-skill premium. While these results appear robust, it is always possible that they are the consequence of noise in the unit values. For instance, in specification (C), where we trim the top and bottom 5% of the unit values, the dispersion in unit value becomes significant in some regressions. This hints at the relevance of the scope for product differentiation.

Nevertheless, the key finding from Table 13 is that in all models that control for unit values, sectoral exports are *still* significant in explaining skill premiums. Also, the magnitudes of the estimates are similar to those in Table 12. We interpret this result as a robustness check that supports the view that exports significantly affect the premium paid for skills at the industry level.

5 Concluding Remarks

This paper studied the returns to schooling in Latin America and the Caribbean and its link to exports. We first estimated and described national skill premiums for over five million workers from sixteen countries. Motivated by recent models featuring limited inter-industry factor mobility, we estimated industry-specific skill-premiums for sixty 2-digit ISIC sectors. Finally, we investigated reduced-form regressions linking these industry-specific skill premiums with sectoral exports.

An interesting and previously unknown finding is that unobserved industry- and country-specific effects jointly explain over 60 percent of the observed variance in the skill premium in our sample. Each set of factors has about the same explanatory power for skill premiums in manufacturing sectors. It is thus not clear that industrial policies would succeed anymore than industry-neutral national policies in changing the skill premium. In addition, sectoral exports are related to sectoral skill premiums: sectors with higher exports pay higher wage-skilled premiums. This evidence supports recent trade theories linking exports to wages and to skills, as in Brambilla, Lederman and Porto (2009) and Verhoogen (2008), and highlights the need for further research to understand the mechanisms at work.

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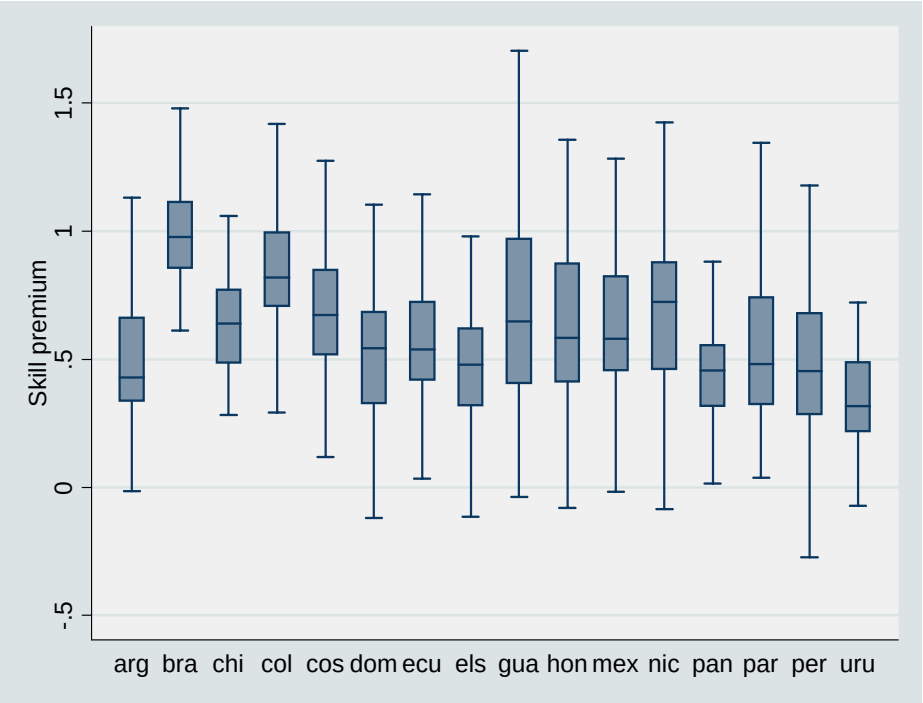
Figure 1
Skill Premium by Industry



Graph displays skill premiums that are industry and country specific.

Figure 2
Industry Exports and Industry Skill Premium
Skill Intensive Tasks

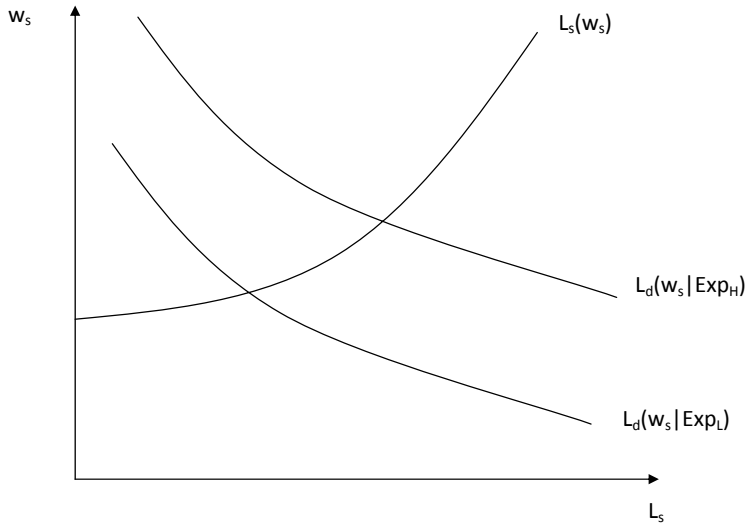


Figure 3
Industry Exports and Industry Skill Premium
Fair Wages and Profit Sharing

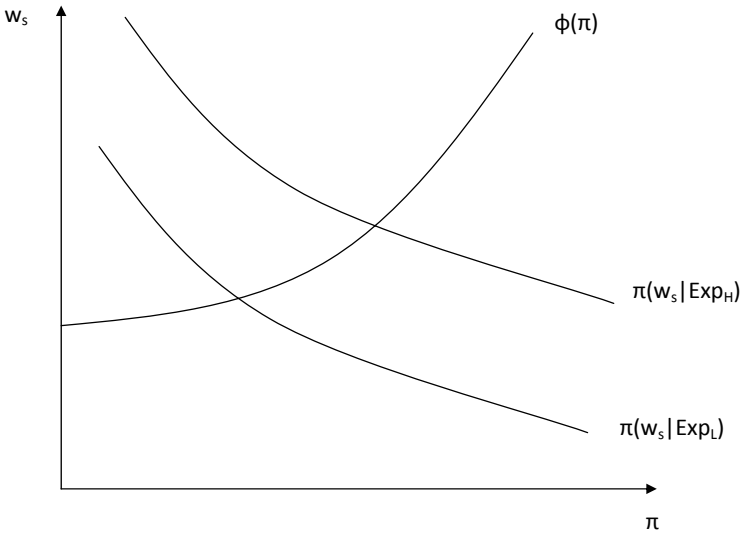


TABLE 1. Description of Household Surveys

Country	Name of Survey	Survey years	Obs.
Argentina	Encuesta Permanente de Hogares (EPH-C) semestre II	2004, 2005	167,770
Brazil	Pesquisa Nacional por Amostra de Domicilios (PNAD)	2002, 2003, 2004	1,169,598
Chile	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	2000, 2003	509,825
Colombia	Encuesta Continua de Hogares (ECH)	2001, 2003, 2004	315,528
Costa Rica	Encuesta de Hogares de Propósitos Múltiples (HPM)	2001, 2002, 2003, 2004	173,403
Dominican Rep.	Encuesta Nacional de Fuerza de Trabajo (ENFT) onda Octubre	2000, 2001, 2002, 2003, 2004, 2005, 2006	184,611
Ecuador	Encuesta de Empleo, Desempleo y Subempleo (ENEMDU)	2003, 2004, 2005	242,410
El Salvador	Encuesta de Hogares de Propósitos Múltiples (EHPM)	2000, 2001, 2002, 2003, 2004, 2005	409,093
Guatemala	Encuesta Nacional de Empleo e Ingresos (ENEI)	2002, 2003, 2004	91,343
Honduras	Encuesta Permanente de Hogares de Propósitos Múltiples (EPHPM)	2001, 2004, 2005, 2006	206,868
Mexico	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)	2000, 2002, 2004, 2005, 2006	384,168
Nicaragua	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida (EMNV)	2001, 2005	59,424
Panama	Encuesta de Hogares (EH)	2001, 2002, 2003, 2004	217,173
Paraguay	Encuesta Permanente de Hogares (EPH)	2002, 2003, 2004, 2005	137,709
Peru	Encuesta Nacional de Hogares (ENAHO)	2000, 2001, 2002, 2003, 2004, 2005	409,665
Uruguay	Encuesta Continua de Hogares (ECH)	2000, 2001, 2002, 2003, 2004, 2005	337,001

Table lists the surveys used in the estimation of the national-level and industry-specific skil premiums

TABLE 2. Skill Endowments

Country	Average years of education	Share of skilled workers[a]			Share of highly-skilled workers[b]		
		All	Male	Female	All	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Argentina	10.63	0.52	0.49	0.53	0.23	0.24	0.21
Brazil	6.94	0.13	0.11	0.14	0.28	0.33	0.25
Chile	8.89	0.37	0.37	0.38	0.23	0.24	0.23
Colombia	8.53	0.20	0.21	0.19	0.56	0.56	0.55
Costa Rica	7.55	0.18	0.18	0.17	0.36	0.38	0.34
Dominican Rep.	7.96	0.30	0.28	0.32	0.35	0.35	0.34
Ecuador	7.95	0.31	0.31	0.32	0.32	0.33	0.32
El Salvador	6.20	0.23	0.24	0.22	0.19	0.21	0.17
Guatemala	5.70	0.19	0.22	0.16	0.27	0.32	0.22
Honduras	5.99	0.20	0.19	0.21	0.30	0.37	0.24
Mexico	7.94	0.27	0.28	0.26	0.41	0.45	0.37
Nicaragua	5.31	0.09	0.09	0.09	0.46	0.49	0.42
Panama	8.81	0.36	0.32	0.39	0.30	0.27	0.33
Paraguay	7.25	0.24	0.23	0.24	0.22	0.22	0.22
Peru	7.85	0.22	0.24	0.21	0.46	0.46	0.47
Uruguay	9.82	0.35	0.32	0.37	0.36	0.33	0.38

(a): Share of workers with a high school diploma or more (skilled) in the total number of workers. (Semi-skilled + Highly-skilled)/(Unskilled + Semi-skilled + Highly-skilled).
(b): Share of workers with more than a high school diploma (highly-skilled) in all workers with at least a high school diploma (skilled). (Highly-skilled)/(Semi-skilled + Highly-skilled).

TABLE 3. Skill Premium

Country	Average Premium			Gender Differences		
	Skill Premium	Semi-skilled	Highly-skilled	Skill Premium	Semi-Skilled	Highly-Skilled
	(1)	(2)	(3)	(4)	(5)	(6)
Argentina	0.48	0.39	0.83	-0.05***	-0.06***	-0.04*
	[0.007]	[0.007]	[0.011]	[0.014]	[0.015]	[0.021]
Brazil	0.98	0.84	1.15	0.14***	0.1***	0.14***
	[0.004]	[0.004]	[0.006]	[0.007]	[0.008]	[0.012]
Chile	0.60	0.40	1.16	0.02**	-0.02**	0.09***
	[0.005]	[0.005]	[0.006]	[0.009]	[0.009]	[0.011]
Colombia	0.90	0.59	1.14	-0.04***	-0.1***	-0.01
	[0.008]	[0.01]	[0.009]	[0.014]	[0.02]	[0.016]
Costa Rica	0.73	0.56	0.98	0.05*	0.01	0.07*
	[0.016]	[0.018]	[0.022]	[0.03]	[0.035]	[0.042]
Dominican Rep.	0.49	0.28	0.91	-0.05***	-0.07***	0.02
	[0.007]	[0.008]	[0.01]	[0.013]	[0.015]	[0.018]
Ecuador	0.53	0.39	0.90	-0.13***	-0.17***	-0.05***
	[0.008]	[0.008]	[0.011]	[0.013]	[0.015]	[0.018]
El Salvador	0.47	0.38	0.95	-0.03***	-0.09***	0.03
	[0.006]	[0.006]	[0.01]	[0.01]	[0.011]	[0.019]
Guatemala	0.74	0.62	1.07	-0.2***	-0.19***	-0.32***
	[0.02]	[0.022]	[0.032]	[0.036]	[0.04]	[0.063]
Honduras	0.72	0.55	1.03	0.00	-0.08***	-0.06
	[0.013]	[0.014]	[0.02]	[0.023]	[0.026]	[0.037]
Mexico	0.68	0.46	1.03	-0.14***	-0.28***	-0.06**
	[0.012]	[0.014]	[0.016]	[0.022]	[0.026]	[0.029]
Nicaragua	0.74	0.45	1.02	0.15***	0.02	0.22***
	[0.023]	[0.03]	[0.03]	[0.042]	[0.057]	[0.055]
Panama	0.48	0.33	0.89	-0.12***	-0.13***	0.03
	[0.008]	[0.008]	[0.011]	[0.015]	[0.016]	[0.02]
Paraguay	0.54	0.44	0.94	-0.04*	-0.04*	0.03
	[0.012]	[0.013]	[0.02]	[0.021]	[0.023]	[0.035]
Peru	0.43	0.26	0.72	-0.13***	-0.15***	-0.13***
	[0.007]	[0.008]	[0.009]	[0.012]	[0.015]	[0.016]
Uruguay	0.38	0.24	0.62	-0.03	-0.02	0.06**
	[0.011]	[0.012]	[0.016]	[0.021]	[0.024]	[0.029]

Columns (1), (4): Log wage regressions with one skill level. Columns (2)--(3), (5)--(6): Regressions with two skill levels. Columns (4), (5), (6) display difference in skill premium between males and females. All results are relative to unskilled workers, the omitted category. Standard errors in brackets. All results in (1), (2), (3) are significant at the 1 percent level.

Table 4. Educational Attainment Dummies

Country	Element.	Some HS	HS Diploma	Some College	College Degree
Argentina	0.19	0.32	0.52	0.72	1.02
	[0.014]	[0.014]	[0.014]	[0.016]	[0.015]
Brazil	0.27	0.32	0.56	0.96	1.50
	[0.004]	[0.005]	[0.003]	[0.005]	[0.005]
Chile	0.15	0.25	0.51	0.89	1.35
	[0.007]	[0.007]	[0.006]	[0.009]	[0.007]
Colombia	0.18	0.31	0.52	0.92	1.38
	[0.008]	[0.008]	[0.009]	[0.013]	[0.011]
Costa Rica	0.15	0.34	0.56	1.01	1.41
	[0.019]	[0.022]	[0.024]	[0.024]	[0.038]
Dominican Rep.	0.14	0.19	0.30	0.50	1.02
	[0.01]	[0.009]	[0.01]	[0.012]	[0.011]
Ecuador	0.20	0.30	0.52	0.81	1.15
	[0.009]	[0.011]	[0.012]	[0.013]	[0.014]
El Salvador	0.14	0.20	0.35	0.59	1.01
	[0.007]	[0.012]	[0.007]	[0.011]	[0.01]
Guatemala	0.26	0.37	0.78	0.99	1.36
	[0.017]	[0.023]	[0.022]	[0.037]	[0.034]
Honduras	0.23	0.42	0.74	0.95	1.47
	[0.012]	[0.016]	[0.016]	[0.026]	[0.023]
Mexico	0.24	0.40	0.70	0.97	1.32
	[0.015]	[0.015]	[0.018]	[0.023]	[0.02]
Nicaragua	0.13	0.28	0.41	0.61	1.17
	[0.021]	[0.02]	[0.026]	[0.039]	[0.031]
Panama	0.19	0.30	0.51	0.80	1.23
	[0.012]	[0.013]	[0.014]	[0.015]	[0.016]
Paraguay	0.18	0.37	0.58	0.74	1.12
	[0.012]	[0.014]	[0.019]	[0.019]	[0.021]
Peru	0.16	0.25	0.33	0.49	0.79
	[0.009]	[0.009]	[0.009]	[0.012]	[0.01]
Uruguay	0.12	0.32	0.41	0.60	1.01
	[0.019]	[0.019]	[0.023]	[0.023]	[0.024]

Coefficients from low wage regressions on 5 educational attainment

TABLE 5. Skill Premium by Industry: Summary Statistics

	All countries	Arg	Bra	Chi	Col	Cos	Dom	Ecu	Els	Gua	Hon	Mex	Nic	Pan	Par	Per	Uru
Mean	0.62	0.50	1.00	0.71	0.86	0.71	0.54	0.55	0.48	0.69	0.67	0.62	0.71	0.47	0.51	0.47	0.36
Median	0.58	0.43	0.98	0.64	0.82	0.67	0.54	0.54	0.48	0.65	0.58	0.58	0.72	0.46	0.48	0.45	0.32
Std. Dev.	0.37	0.32	0.28	0.36	0.34	0.52	0.29	0.32	0.26	0.42	0.43	0.28	0.45	0.25	0.27	0.29	0.22
10th Percentile	0.23	0.16	0.71	0.37	0.53	0.24	0.20	0.16	0.23	0.12	0.24	0.27	0.24	0.19	0.23	0.17	0.15
90th Percentile	1.07	0.83	1.29	1.13	1.22	1.22	0.86	0.78	0.73	1.14	1.17	1.03	1.41	0.75	0.83	0.83	0.69
Number of Coeff.	764	53	57	50	57	53	50	52	45	36	48	47	33	46	42	50	45
Positive	743	52	57	50	56	50	49	49	44	35	47	46	31	45	42	47	43
Pos. Signif. [a]	643	43	57	50	53	40	43	44	38	28	39	42	26	40	31	39	30
Negative	21	1	0	0	1	3	1	3	1	1	1	1	2	1	0	3	2
Neg. Signif. [a]	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

a: significant at the 5 percent level

TABLE 6. Industries with High and Low Skill Premium

	Industry	Obs (1)	Mean (2)	Above p50 (3)	Above p25 (4)	Below p75 (5)
PANEL A: Industries with High Skill Premium						
99	Extra-territorial organizations and bodies	8	1.12	88%	75%	13%
73	Research and development	9	0.99	89%	56%	11%
74	Other business activities	16	0.94	100%	88%	0%
2	Forestry, logging and related service activities	15	0.9	53%	33%	40%
1	Agriculture, hunting and related service activities	16	0.88	88%	44%	0%
26	Manufacture of other non-metallic mineral products	16	0.87	94%	50%	6%
70	Real estate activities	15	0.87	87%	67%	13%
23	Manufacture of coke, refined petroleum products and nuclear fuel	7	0.84	86%	71%	14%
14	Other mining and quarrying	13	0.82	54%	38%	15%
85	Health and social work	16	0.82	88%	63%	0%
PANEL B: Industries with Low Skill Premium						
27	Manufacture of basic metals	12	0.46	33%	8%	42%
55	Hotels and restaurants	16	0.45	0%	0%	63%
71	Renting of machinery, equipment and household goods	13	0.45	23%	23%	54%
18	Manufacture of wearing apparel; dressing and dyeing of fur	16	0.43	13%	0%	50%
28	Fabricated metal products, except machinery and equipment	16	0.43	31%	0%	50%
36	Manufacture of furniture; manufacturing n.e.c.	16	0.43	19%	6%	50%
93	Other service activities	16	0.42	13%	0%	63%
62	Air transport	12	0.41	42%	25%	42%
60	Land transport; transport via pipelines	16	0.35	0%	0%	81%
95	Private households with employed persons	16	0.13	0%	0%	100%

Table lists the 10 industries with the highest and lowest average skill premium (the average is computed across countries and is displayed in column 2). Columns 3, 4, 5 display the percentage of countries for which the industry ranks in the highest 50th percentile, highest 25th percentile and lowest 25th percentile

TABLE 7. Semi-Skilled and Highly-Skilled Premium by Industry: Summary Statistics

	All	Arg	Bra	Chi	Col	Cos	Dom	Ecu	Els	Gua	Hon	Mex	Nic	Pan	Par	Per	Uru
Panel A: Semi-Skilled																	
Mean	0.44	0.39	0.88	0.49	0.50	0.53	0.31	0.37	0.37	0.56	0.49	0.38	0.56	0.31	0.39	0.27	0.24
Median	0.41	0.36	0.84	0.42	0.52	0.52	0.29	0.39	0.37	0.50	0.46	0.43	0.47	0.31	0.40	0.27	0.23
P10	0.11	0.09	0.64	0.27	0.10	0.16	0.05	-0.05	0.05	0.07	0.16	0.12	0.16	0.10	0.16	-0.12	0.06
P90	0.84	0.76	1.19	0.76	0.81	1.05	0.65	0.60	0.72	1.31	0.96	0.69	0.97	0.55	0.67	0.60	0.50
Std. Dev.	0.35	0.27	0.25	0.30	0.30	0.56	0.30	0.31	0.26	0.45	0.29	0.24	0.41	0.20	0.21	0.27	0.19
Number of Coeff.	761	53	57	50	56	51	50	52	45	36	48	47	33	46	42	50	45
Positive	716	50	57	50	52	47	46	46	42	34	46	45	32	44	41	43	41
Pos. Signif. [a]	564	39	56	48	45	35	37	36	36	27	36	32	21	33	30	31	22
Negative	45	3	0	0	4	4	4	6	3	2	2	2	1	2	1	7	4
Neg. Signif. [a]	3	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0
Panel B: Highly-Skilled																	
Mean	0.96	0.85	1.02	1.23	1.14	1.05	0.91	0.90	1.02	0.93	0.98	1.06	0.85	0.87	1.02	0.77	0.64
Median	0.95	0.83	1.05	1.19	1.04	0.96	0.94	0.96	1.04	1.01	0.96	1.06	0.87	0.88	0.96	0.78	0.60
P10	0.44	0.45	0.61	0.83	0.60	0.32	0.49	0.42	0.55	0.16	0.49	0.48	0.18	0.45	0.65	0.29	0.09
P90	1.44	1.22	1.35	1.66	1.66	2.00	1.28	1.35	1.44	1.49	1.52	1.63	1.54	1.34	1.53	1.29	1.21
Std. Dev.	0.47	0.47	0.32	0.41	0.52	0.69	0.27	0.42	0.42	0.50	0.48	0.43	0.56	0.37	0.47	0.40	0.41
Number of Coeff.	753	53	57	50	57	52	49	52	44	36	47	47	28	47	40	49	45
Positive	737	52	57	50	57	50	49	49	43	35	45	47	27	46	39	48	43
Pos. Signif. [a]	637	45	54	49	51	35	46	44	40	25	40	42	20	40	33	41	32
Negative	16	1	0	0	0	2	0	3	1	1	2	0	1	1	1	1	2
Neg. Signif. [a]	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

a: significant at the 5 percent level

TABLE 8. Industries with High and Low Skill Premium for the Highly-Skilled

Industry		Obs (1)	Mean (2)	Above p50 (3)	Above p25 (4)	Below p75 (5)
PANEL A: Industries with High Skill Premium						
32	Manufacture of radio, television and communication equipment	6	1.43	100%	50%	0%
99	Extra-territorial organizations and bodies	8	1.39	88%	50%	0%
74	Other business activities	16	1.23	94%	69%	0%
26	Manufacture of other non-metallic mineral products	16	1.22	81%	56%	13%
21	Manufacture of paper and paper products	12	1.19	50%	42%	17%
1	Agriculture, hunting and related service activities	16	1.17	81%	31%	6%
2	Forestry, logging and related service activities	13	1.15	54%	46%	23%
13	Mining of metal ores	10	1.15	50%	20%	30%
45	Construction	16	1.15	75%	31%	0%
17	Manufacture of textiles	15	1.14	67%	47%	7%
PANEL B: Industries with Low Skill Premium						
62	Air transport	12	0.83	42%	33%	58%
19	Tanning and dressing of leather; manuf. of leather products	15	0.81	47%	20%	40%
90	Sewage and refuse disposal, sanitation and similar activities	9	0.81	67%	44%	33%
66	Insurance and pension funding, except compulsory social security	14	0.8	36%	14%	36%
36	Manufacture of furniture; manufacturing n.e.c.	16	0.73	31%	13%	50%
72	Computer and related activities	12	0.71	42%	8%	42%
55	Hotels and restaurants	16	0.68	0%	0%	69%
71	Renting of machinery, equipment and household goods	13	0.66	38%	23%	62%
60	Land transport; transport via pipelines	16	0.59	0%	0%	75%
95	Private households with employed persons	15	0.18	0%	0%	93%

Table lists the 10 industries with the highest and lowest average skill premium for the highly-skilled (the average is computed across countries and is displayed in column 2). Columns 3, 4, 5 display the percentage of countries for which the industry ranks in the highest 50th percentile, highest 25th percentile and lowest 25th percentile

TABLE 9. Country Effects and Industry Effects

Model	R2	F-test (p-value)
ALL SECTORS		
M1: only country dummies	0.20	13.80 (0.0000)
M2: only industry dummies	0.48	12.75 (0.0000)
M3: country & industry dummies	0.69	
country dummies		33.72 (0.0000)
industry dummies		21.00 (0.0000)
MANUFACTURING		
M1: only country dummies	0.28	8.82 (0.0000)
M2: only industry dummies	0.24	5.54 (0.0000)
M3: country & industry dummies	0.49	
country dummies		10.13 (0.0000)
industry dummies		19.03 (0.0000)
NON-TRADABLES & SERVICES		
M1: only country dummies	0.17	6.78 (0.0000)
M2: only industry dummies	0.57	19.03 (0.0000)
M3: country & industry dummies	0.77	
country dummies		24.27 (0.0000)
industry dummies		36.15 (0.0000)

The table lists the R2 of regressions of the industry-skill premium on country dummies, industry dummies and both country and industry dummies.

TABLE 10. Country Effects

Country	Coefficient	Std Error
Argentina		
Brasil	0.029	0.003
Chile	0.047	0.004
Colombia	0.018	0.004
Costa Rica	0.020	0.005
Dominican Republic	-0.005	0.004
Ecuador	0.002	0.004
Guatemala	0.007	0.005
Honduras	0.008	0.004
Mexico	0.012	0.005
Nicaragua	-0.003	0.006
Panama	0.002	0.004
Peru	-0.002	0.004
Paraguay	0.004	0.005
El Salvador	-0.010	0.004
Uruguay	-0.007	0.005

The table lists the estimates of the country fixed effects from regression including both country and and industry fixed effects.

TABLE 11. Industry Effects

Industry	Coefficient	Std Error	Industry	Coefficient	Std Error	Industry	Coefficient	Std Error
2	-0.005	0.008	29	0.023	0.008	63	0.032	0.007
5	-0.021	0.007	30	0.046	0.018	64	0.051	0.007
10	-0.003	0.022	31	0.037	0.010	65	0.050	0.006
11	0.030	0.012	32	0.074	0.014	66	0.046	0.009
13	0.024	0.009	33	0.032	0.012	67	0.063	0.013
14	0.016	0.009	34	0.025	0.010	70	0.029	0.007
15	0.012	0.005	35	0.022	0.010	71	0.023	0.011
16	0.021	0.010	36	-0.004	0.006	72	0.069	0.011
17	0.034	0.007	37	0.043	0.018	73	0.060	0.012
18	0.001	0.005	40	0.040	0.007	74	0.059	0.005
19	0.003	0.007	41	0.014	0.007	75	0.038	0.004
20	0.003	0.007	45	0.002	0.004	80	0.038	0.004
21	0.037	0.009	50	0.012	0.006	85	0.060	0.005
22	0.035	0.008	51	0.038	0.006	90	0.003	0.008
23	0.057	0.013	52	0.005	0.005	91	0.033	0.007
24	0.051	0.007	53	0.025	0.007	92	0.029	0.006
25	0.024	0.008	55	-0.008	0.005	93	-0.007	0.006
26	0.028	0.007	60	-0.012	0.005	95	-0.044	0.005
27	0.013	0.009	61	0.036	0.011	98	0.071	0.046
28	0.005	0.006	62	0.038	0.012	99	0.058	0.011

The table lists the industry fixed effects from regressions including both country and industry effects.

TABLE 12. Exports and the Industry-Skill Premium

	(1)	(2)	(3)	(4)	(5)
log Exports/GDP	0.0028***	0.0033***	0.0004	-0.0002	0.0027**
	(0.001)	(0.0011)	(0.0011)	(0.0015)	(0.001)
log GDP_pc					0.0284***
					(0.004)
log Skilled/Unskilled					-0.014***
					(0.004)
Country Dummies	No	No	Yes	Yes	No
Industry Dummies	No	Yes	No	Yes	Yes
Observations	273	273	273	273	273
R-squared	0.03	0.31	0.43	0.58	0.46

Standard errors in parenthesis. Significance at 1, 5 and 10 percent denoted by ***, ** and *

TABLE 13. Export Unit Values and the Skill Premium

	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A						
Log Unit value	0.0015		0.0009	0.0010		0.0009
	(0.001)		(0.0022)	(0.0011)		(0.0022)
log Var(Unit_value)		0.0006	0.0003		0.0004	0.00005
		(0.0004)	(0.0009)		(0.0004)	(0.0009)
log Exports/GDP				0.0025**	0.0025**	0.0025**
				(0.0011)	(0.0011)	(0.0011)
Observations	273	273	273	273	273	273
R-squared	0.45	0.45	0.45	0.47	0.47	0.47
PANEL B						
Log Unit value	0.0035		0.0026	0.0022		0.0017
	(0.0037)		(0.0038)	(0.0037)		(0.0038)
log Var(Unit_value)		0.0006	0.0005		0.0004	0.0003
		(0.0004)	(0.0004)		(0.0004)	(0.0004)
log Exports/GDP				0.0026**	0.0025**	0.0025**
				(0.0011)	(0.0011)	(0.0011)
Observations	273	273	273	273	273	273
R-squared	0.45	0.45	0.45	0.46	0.47	0.47
PANEL C						
Log Unit value	0.0023*		0.0005	0.0019		0.0003
	(0.0012)		(0.0023)	(0.0012)		(0.0023)
log Var(Unit_value)		0.0011**	0.0009		0.0009*	0.0008
		(0.0005)	(0.0010)		(0.0005)	(0.001)
log Exports/GDP				0.0025**	0.0024**	0.0024**
				(0.0011)	(0.0011)	(0.0011)
Observations	273	273	273	273	273	273
R-squared	0.46	0.46	0.46	0.47	0.47	0.47

Standard errors in parenthesis. Significance at 1, 5 and 10 percent denoted by ***, ** and *