

Trade liberalisation and wage premium in Argentina

Further evidence from the 1990s^{+,&}

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(Work in Progress)

Abstract

Latin American countries have been implementing policies directed to the removal of barriers on international trade. Among the reasons for following this strategy were the expectations it would help to reduce income inequality. The empirical evidence available is far from being conclusive. In the case of Argentina, the country started at the end of 1988 a unilateral reduction of imports barriers. During the 1990s the country also implemented a discriminatory liberalisation under the umbrella of MERCOSUR. Previous evidence has found increasing trade flows, especially imports, have been partially responsible for the observed increase in wage inequality. However, the estimated effects are rather small. Following Wood's (1997) hypothesis we allow for the effects of trade liberalisation to vary depending on the skill intensity of production of exports and imports. The evidence for 1992-1999 confirms that the role of trade liberalisation has been relatively small. In our case this result is due to the presence of opposite effects that are a function of the degree of skill-intensity of trade flows. Contrary to the common belief, the raise in the wage premium of skilled labour worked mostly through the increase of skill-intensive exports than through changes in imports which are intensive in unskilled labour.

Key words: trade liberalisation, relative wages, Argentina.

JEL: F14, F16

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1. Introduction

A key policy implemented by several developing countries in Latin America, which has not been free of controversy, was the openness of their economies through the removal of barriers on international trade, reducing tariffs and non-tariff barriers. Whilst in some cases this policy adopted the form of unilateral liberalisation (i.e. Chile), in others it was followed mainly under a discriminatory basis (i.e. MERCOSUR), in most cases there was a combination of these two alternatives. Besides the efficiency gains that would follow the reduction of trade barriers, was the belief it would produce a reduction in income inequality within each country. These expectations were based on the assumption that the removal of trade barriers would induce a convergence in the wage rates of workers with different levels of skills. However, contrary to these expectations, in some cases, the reduction of trade barriers was accompanied by an increasing wage inequality in favour of more skilled labour (Robbins, 1994 1996a, 1996b, 1996c; Robins *et al.*, 1996; Galiani and Sanguinetti, 2003; Acosta, 2001; Acosta and Gasparini, 2007; Cicowiez, 2002). Different hypotheses have been proposed to explain this finding.

In the specific case of Argentina, the country started at the end of 1988 a unilateral reduction of imports barriers, both tariffs and non-tariffs. Almost simultaneously, Argentina and Brazil initiated a process of regional integration with the signature of the “Treaty of Integration, Cooperation and Development” explicitly setting the objective of reaching a Common Market. In July 1990 the “Buenos Aires Act” was signed, with the objective of achieving a Free Trade Area by 1994. This Act is the immediate record of MERCOSUR, which was launched one year later, in June 1991, with the joining of Paraguay and Uruguay and the signature of the “Asuncion Treaty”. As was possible to expect, during this period there was an important increase of Argentinean trade flows, especially with other MERCOSUR members (Brazil mainly), but also with the ROW.

Recent empirical evidence with focus on Argentina have found that increasing trade flows, especially imports, have been responsible, at least partially, for the observed increase in wage inequality (Galiani and Sanguinetti, 2000 and 2003, Acosta, 2001 and Acosta and Gasparini, 2007). However, a common finding shared by this evidence is that the increase in the wage premium explained by changes in trade flows is just a small fraction of the observed changes. In the sections that follow we look to provide some new evidence in order to explain this result. Our argument is based on the hypotheses proposed by Wood (1997). This hypothesis points out to the fact that the liberalisation of Latin American economies during the '80s and '90s took place simultaneously with the openness of East Asian economies, countries which have a greater relative endowment of unskilled labour. Then, a greater openness by Latin American countries favoured the production of sectors with intermediate skill-intensity, shrinking that of both high and low skill-intensive sectors. Since the effects of these two changes work in opposite directions, it becomes difficult to predict the net effect on relative wages. Also, as these opposite effects tend to compensate each other, the aggregate effect could be expected to be rather small.

The rest of the paper is organised as follows. Section 2 briefly summarizes the predictions of the effects that trade liberalisation might have on the relative wage between skilled and unskilled labour, in this section we point out that in the case of a country like Argentina is more difficult to a predict the direction of this effect. In section 3 we present new econometric evidence, based on Wood's argument we allow for the effects of trade liberalisation to vary depending on the skill intensity of production of exports and imports. Section 4 summarises.

2. Trade, technical change and wage inequality: explaining the puzzle

When trying to explain the behaviour of relative wages as a response to the implementation of trade liberalisation policies, the 2x2x2 Heckscher-Ohlin (H-O) model constitutes the benchmark tool. Under the usual set of assumptions, the Stolper-Samuelson (S-S) theorem predicts that an increase in the relative price of a good raises the return to the factor used intensively in the production of that good relative to all goods, and lowers the return to the other factor relative to all goods. Then, the S-S theorem implies that for developing countries, which are assumed to be relatively abundant in unskilled labour, the reduction of trade barriers would induce a fall in the difference between skilled and unskilled labour returns. The opposite would happen in the case of skilled-labour abundant countries.

In contrast with what was expected a priori, as many developing countries implemented during the '80s and '90s a policy directed to the reduction of their trade barriers, was possible to observe an increase in the relative wage of skilled workers. Evidence for Latin American countries are Robbins (1994, 1996a, 1996b and 1996c); Robbins et al. (1996); Porto (2000); Acosta (2001); Cicowiez (2002); Acosta and Gasparini (2007); Galiani and Sanguinetti (2003).

Alternative extensions of the H-O model have been proposed to justify these findings. A first explanation emerges when we assume there are more than two goods. With no country being fully diversified in equilibrium, some developing countries specialise in the production of intermediate skill-intensive goods, since they have an intermediate relative abundance of skilled labour. Then, the reduction of trade barriers could either increase or decrease the relative return to unskilled labour since trade causes the most and the least skill-intensive sectors to contract. Wood (1995 and 1997) suggests this argument could help to explain the process observed in Latin America during the '80s and '90s, during this period the reduction of trade barriers coincided with an increased

openness by East Asian economies, countries with a greater relative endowment of unskilled labour.

A second explanation involves the inclusion of non-traded goods. In this case, the possibility of different outcomes arises from particular patterns of substitution in consumption between traded and non-traded goods, as well as their skill intensity.

Another explanation arises when we introduce a third factor of production. If the third factor is complement of skilled labour, greater openness in a country with a relatively large supply of this third factor (even when relatively scarce in skilled labour) would increase the output of the good that uses it intensively, which requires also a high ratio of skilled to unskilled-labour, being possible to observe a higher relative demand for skilled workers.

Other hypotheses suggest that the simultaneous increase in wage inequality, both in less and more developed countries, can be explained by the movement of capital from more to less developed countries and by the introduction of new production techniques. The capital mobility hypothesis is based on the idea that firms located in developed countries have moved the production of their least skill-intensive goods to countries with a relative abundance of unskilled labour. Even when these goods can be characterised as unskilled-intensive from the point of view of developed countries, they are relatively skill-intensive from the point of view of the host countries. In this case, the relative demand for skilled-labour rises in both developed and less developed countries, inducing an increase in the relative wage of skilled-workers. The 'outsourcing' hypothesis, proposed among others by Feenstra and Hanson (1995), has been widely documented for the cases of both developed and less developed countries (Feenstra and Hanson, 1995, 1996, 1997, 1999; Anderton and Brenton, 1999; Anderton *et al.*, 2002; etc.). As Wood (1995 and 1997) points out, increasing openness in developing countries affects the structure of labour demand in two ways, by altering the composition of production and by changing the available technology. The final result will depend on the size of these two effects, and on the nature of the differences between domestic and world technology. In this case is

possible to obtain an outcome contrary to the H-O model, which assumes that all countries have access to the same technology.

Regarding the technological change hypothesis there is still a debate over if what matters is the sector or factor bias of the technical change. Under the assumptions of the textbook H-O model for a small open economy, only the sector bias of the technical change matters. For instance, in the case of a CES production function¹, the proportional change ($\hat{\cdot}$) in the skilled/unskilled relative wage is (Haskel and Slaughter, 2002):

$$\left(\frac{w_h}{w_l}\right) = \frac{1}{\omega_x - \omega_y} \left[\left(\frac{P_x}{P_y}\right) + \left(\frac{A_x}{A_y}\right) + \hat{\delta}_x \left(\frac{\sigma}{\sigma-1}\right) \left(\frac{\omega_x - \delta_x}{1 - \delta_x}\right) - \hat{\delta}_y \left(\frac{\sigma}{\sigma-1}\right) \left(\frac{\omega_y - \delta_y}{1 - \delta_y}\right) \right]$$

where ω_i is the skilled labour share in sector i 's wage bill. Then, under the assumption X is the skill-intensive sector we have $\omega_x - \omega_y > 0$. Additionally, the assumption that

producers only apply cost reducing technical progress means $\left(\frac{\sigma}{\sigma-1}\right) \left(\frac{\omega_i - \delta_i}{1 - \delta_i}\right) > 0$.

From the formula above, a sector-specific technical progress in sector X (increase in A_x and/or δ_x) increases the relative wage of skilled labour. The same result arises under a X -biased factor-neutral sector-pervasive technical progress ($\hat{A}_x - \hat{A}_y > 0$). On the other hand, if technical progress is both sector-pervasive and skilled labour biased, δ_x and δ_y increases simultaneously, the effect on w_h/w_l is ambiguous.² The rationale behind these results is clearly explained by Haskel and Slaughter (2002). In the case of technical progress being sector-specific the profitability of the sector enjoying the change increases relative to the other sector. Then, a sector-specific technical progress in sector X means producers in that sector will expand their production. But since sector X is more skill-

¹ $Q_i = A_i \left[\delta_i H_i^{1-1/\sigma} + (1 - \delta_i) L_i^{1-1/\sigma} \right]^{\sigma/(\sigma-1)}$, where σ , the elasticity of substitution between skilled and

unskilled labour, is assumed to be constant and $0 < \sigma < \infty$.

² Technical change is sector-specific when it occurs only in one sector and sector-pervasive when it happens in both sectors. Regarding the factor bias, technical change is neutral when it affects A_i , while it is skilled (unskilled) labour biased when δ_i increases (decreases).

intensive than sector Y , and factor supplies are assumed to be fixed, there will be an excess demand for skilled labour such that w_h/w_l will rise until profit opportunities across the two sectors become equal. A similar process takes place under an X -biased factor-neutral sector-pervasive technical progress. On the other hand, when technical progress is sector-pervasive and factor-biased is not possible to know a priori what sector increases its relative profitability. In this case, in both sectors the profitability of employing the factor the technical progress is biased to increases relative to the other factor; however this information alone is not enough to know the shifts in profitability across the two sectors.

If the economy is not small we have that, under certain circumstances, it is possible to know how sector-pervasive factor-biased technical affect relative wages. Xu (2001a) summarises the results for different scenarios depending on the economy being small or not, and the technological progress being sector or factor biased.

A common characteristic of most explanations introducing technical change is that both sector and factor biases are exogenously determined. More recently, there have been some attempts to make endogenous the sector and factor bias of technical change. Some examples are Acemoglu (1998, 2002, 2003) and Xu (2001b). The hypothesis here is that the increase in the relative price of skill-intensive goods, and in the relative supply of skilled labour, could explain the technical change bias in favour of skilled workers and skill-intensive sectors. As countries reduce barriers on trade, the changes in good prices affect the incentives to innovate. Under the assumptions that research activities are skill-intensive, and that most of the innovation process is done by developed countries, which are relatively abundant in skilled labour, the increase in the relative price of skill-intensive goods in developed countries makes more profitable to invest in research which benefits skill-intensive sectors. As developing countries copy the new technology, it produces an effect that goes in opposite direction to the one induced by the change in good prices, with

the final effect on relative wages be dependant on the relative strengths of these two opposite forces.

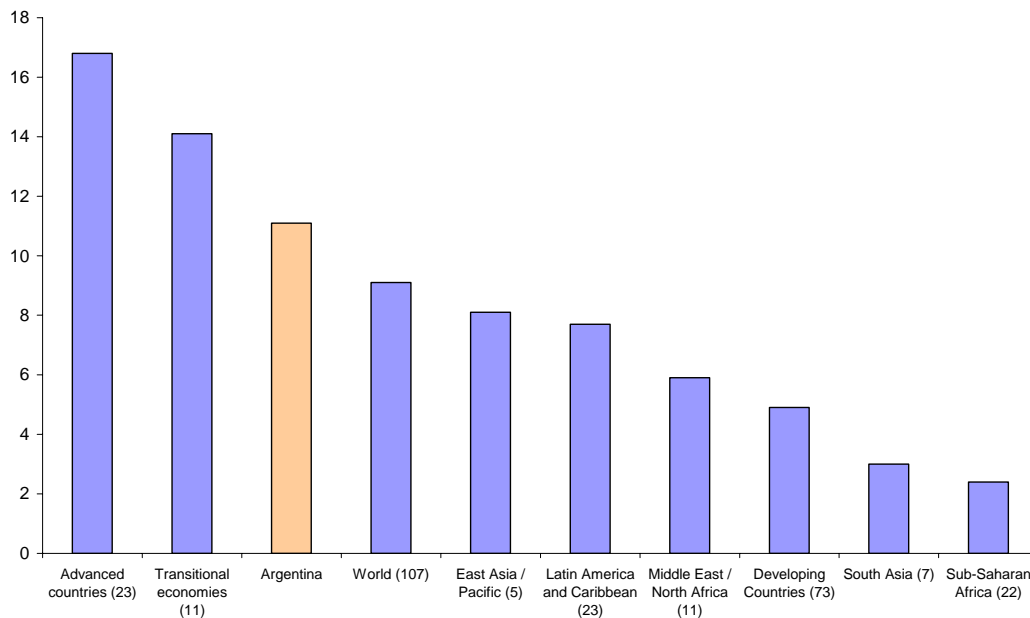
Other examples where technological change is endogenous are Neary (2002 and 2003) and Braun (2006). Neary (2002 and 2003) shows that the simultaneous increase in the skill premium of skilled labour in both developed and developing countries can be explained using a model with oligopolistic good markets, and where foreign competition induces domestic firms to engage in a process of technical innovation. Assuming innovation activities are skill-intensive, the threat by foreign competition means that as firms engage in innovation activities there is an increase in the demand for skilled labour, even when the production of the good itself may be unskilled-intensive. If the increase in the demand for skilled labour due to innovation is large enough the economy as a whole can experience an increase in its relative demand for skilled labour. Neary points out that this kind of models are also useful to explain the effects on relative factor returns of increasing trade liberalisation among developed countries. Moreover, as he points out, the effects on relative factor prices can take place even when actual trade flows are very low, since what matter for firms to decide to engage in innovation activities is the potential threat by foreign firms. This last finding goes in line of answering Krugman's critique, which sustains that the amount of trade among countries is still very small in order to explain the observed changes in relative factor returns.

2.1 Argentina's case: a stylised description

As said before, one of the hypothesis that have been suggested to explain the increase in wage inequality during the liberalisation process of the '90s is the fact that within a world context some Latin American countries, such as Argentina, cannot be classified as labour-unskilled abundant, neither as labour-skilled abundant (Figure 1). Then, as Wood (1995 and 1997) argues, since during the '80s and '90s the reduction of

trade barriers implemented by these economies coincided with an increasing openness from East Asian economies, countries which have greater relative endowment of unskilled labour, the effect of trade liberalisation on Latin American countries was to produce a reduction of sectors both of high and low skill intensity, being not possible to predict the effect on relative wages. Perry and Olarrega (2006) point out that Wood's hypothesis has yet not received enough attention from the vast empirical literature dealing with the effects of trade liberalisation on relative wages. In the next section we try to contribute to fill this gap.

Figure 1: Percentage of population aged 25 and over with complete tertiary/university education in 2000.



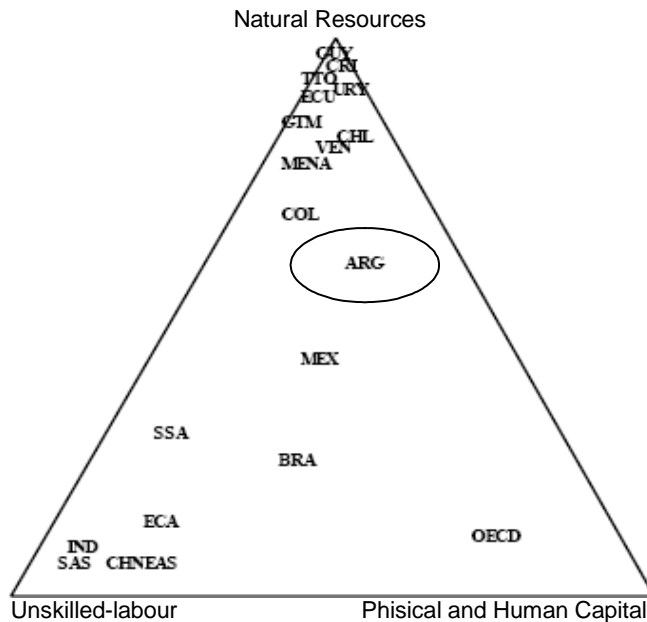
Source: Barro and Lee (2001). Number of countries between brackets.

As shown in Figure 2, Argentina is a country that is relatively abundant in natural resources, mostly land.³ Then, the effect on relative factor returns will depend on the kind of complementarities between natural resources and the other factors of production, as

³ During the nineties there was a very important increase in the production and trade of oil, gas and its derivatives. Extraction of oil and gas is mostly concentrated in the Patagonia, the southern region of Argentina.

well as also on the evolution of the production patterns over time. Perry and Olarreaga (2006) point out that, in the absence of government intervention, “the development path of countries rich in those [factors] highly complementary with capital and skills (minerals, agricultural raw materials and, probably, oil, forestry and fisheries) would have very high skill premiums and inequality all along the development path; while the development path of countries rich in natural resources complementary with unskilled labour (foodstuffs) would follow an intermediate path, with intermediate skill premiums and inequality”. Argentina would fit, according to these authors, into the first group.

Figure 2: Leamer triangle for Latin American countries and other regions in 2000.

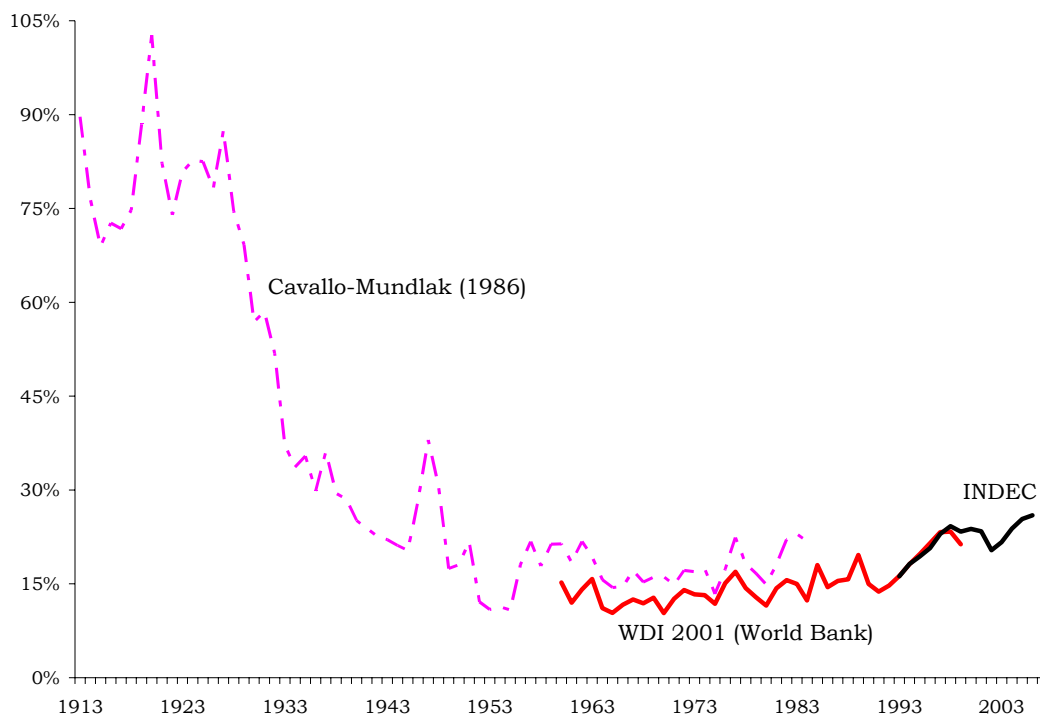


Source: Perry and Olarreaga (2006)

After experiencing a process of fast growth at the beginning of the 20th century, when the country kept strong economic links with the World economy, Argentina started, like other Latin American countries, a process of industrialization based on a policy of import substitution. During this period, which lasted approximately 40 years, Argentina’s exposure to world markets, measured by the ratio of imports plus exports to GDP, felt

almost continuously (Figure 3). At the beginning of the 1970s, and especially between 1976 and 1982, Argentina changed, temporarily, the orientation of its trade policy, with the openness of good and capital markets. This process was partially reversed during the eighties, to be resumed in 1989, and deepened during the nineties, in this case also under a regional framework within the MERCOSUR⁴. Since 1991, the Argentinean economy also underwent an important and deep process of structural changes that included the privatisation of most public enterprises, as well as the deregulation of some key sectors. Since 2003 it is possible to observe some signs pointing out to a reversion of this process.

Figure 3: Openness Index: $(X+M)/GDP$ at current prices (1884-2002)



⁴ The MERCOSUR (Common South Market) is a regional integration agreement among Argentina, Brazil, Paraguay and Uruguay. Venezuela is in the process of becoming full member, while Bolivia and Chile have the status of associated members. The MERCOSUR started in July 1991.

An important element of the policy of import substitution followed by Argentina was the restriction of foreign competition in order to guaranty a domestic demand large enough to create the conditions for the emergence of local producers. Originally, and based on the “infant industry” argument, this protection was supposed to last until domestic production had developed enough, such that it could compete with foreign production. However, the protection of the domestic industry became a permanent policy. An undesirable effect of permanent and high levels of protection is the emergence of a gap between technologies used by domestic and foreign producers. Under these circumstances, the hypothesis of identical technologies across countries, usually assumed in the textbook version of the H-O model, is not sustainable any more. Moreover, since sectors kept aside from foreign competition were mostly those competing with imports, it is not difficult to assume that the technology gap was more important in these sectors, especially those competing with imports from developed countries, than in the case of the production of exportable goods.

Assuming again just two goods X and Y, and that the technology used to produce the exportable good Y is identical to that in the ROW, the change in the skilled/unskilled relative wage ($\hat{w}_h - \hat{w}_l$) is equal to:

$$\hat{w}_h - \hat{w}_l = \frac{(\hat{P}_X - \pi_X) - \hat{P}_Y}{\theta}$$

where \hat{P}_X and \hat{P}_Y are the proportional change in the domestic prices of goods X and Y, $\pi_X (< 0)$ is the proportional reduction, at the initial factor prices, in the unit cost of good X as the result of the technological change, and θ is the difference in the skilled-labour share in the unit cost between goods X and Y, the assumption that X is the skill-intensive good means $\theta > 0$. Then, assuming the reduction of trade barriers changes domestic prices accordingly to what can be expected from the theory (there is an increase in the price of good Y relative to that of good X) we have $\hat{P}_Y > \hat{P}_X$, which, *ceteris paribus*,

induces to a reduction in the wage premium of skilled labour. However, if π_x is large enough, we may observe an increase in the relative wage of skilled labour ($\hat{w}_h - \hat{w}_l > 0$).

In summary, when looking at the effects of trade liberalisation on relative wages, Argentina does not fit very well within the framework of the textbook H-O model, with the response of relative wages as the economy integrates with the ROW being a function of effects that work in opposite directions.

2.2. Wood's hypothesis: a simple presentation

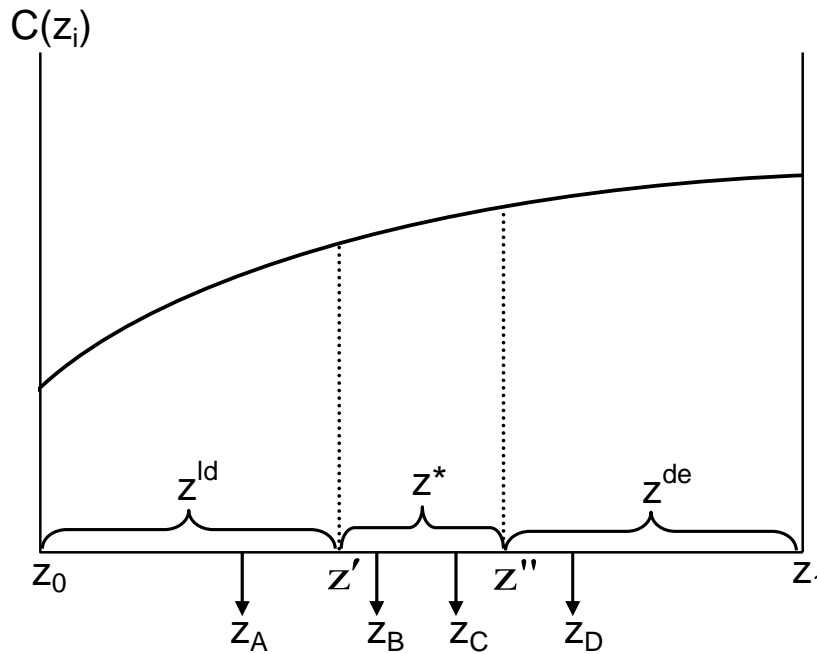
Let us assume there is a small economy, which we refer as the domestic economy, with an endowment of skilled and unskilled labour given by H^* and L^* . The rest of the world (RoW) is divided into two groups of countries: Developed and Less Developed countries. The relative endowment of skilled labour for each of the two blocks is H^{de}/L^{de} and H^{ld}/L^{ld} respectively, with $H^{ld}/L^{ld} < H^*/L^* < H^{de}/L^{de}$. Differences in factor endowments are such that factor prices do not equalise across countries, with $\omega^S > \omega^M > \omega^N$, where $\omega^j = w_h^j/w_l^j$ is the relative skilled wage in country j . We assume there is a continuum of goods indexed by z , with z being in the range $[0,1]$. The assumption that $\omega^S > \omega^M > \omega^N$ always holds means that, *ceteris paribus*, Less Developed countries have a cost advantage in the production of least skill-intensive goods, while Developed countries enjoy a cost advantage in the production of the most skill-intensive goods. The domestic economy has an advantage in the production of goods that are somewhere in the middle of the skill-intensity range.

If there were no barriers to trade, production and trade patterns would be such that Less Developed countries produce and export goods in the subset z^{ld} , Developed countries would produce and export goods in the subset z^{de} , and the domestic economy produces and exports goods in the subset z^* (see Figure 4). The domestic economy will

import from the Less Developed countries goods in the subset z^{ld} , and goods in the subset z^{de} from Developed countries.

The application of an import tariff by the domestic economy would affect its trade and production patterns. In our case we can expect a reduction in the range of goods traded with the RoW and an expansion in the range of goods produced domestically. In Figure 4 we assume that the imposition of an import tariff reduces the set of goods exported to $[z_B, z_C]$, while goods imported from Less Developed countries shrink to $[z_0, z_A]$ and those from Developed countries to $[z_d, z_1]$. In Figure 4 goods in the ranges $[z_A, z_B]$ and $[z_C, z_D]$ becomes non-tradable for the domestic economy. These changes will have opposite effects on the relative wage of skilled labour.

Figure 4: Tariffs, production and trade patterns



Additionally, if we assume Cobb-Douglas preferences, with equal expenditure shares in all goods, and a cost function for good i of the form $C(z_i^j) = (w_h^j)^{\beta(z_i)} (w_l^j)^{1-\beta(z_i)}$, with $\beta(z_i)$ increasing in z (as z_i rises production becomes more skill-intensive), in equilibrium, the relative wage of skilled labour in the domestic economy is equal to:

$$\omega^* = \frac{w_h^*}{w_l^*} = \frac{E^* \int_{Z_A}^{Z_D} \beta(z) dz + (E^{ld} + E^{de}) \int_{Z_B}^{Z_C} \beta(z) dz}{E^* \int_{Z_A}^{Z_D} (1 - \beta(z)) dz + (E^{ld} + E^{de}) \int_{Z_B}^{Z_C} (1 - \beta(z)) dz} \frac{L^*}{H^*}$$

where E^j is total expenditure in country j .⁵

From this last expression we have that the relative wage of skilled labour is affected through changes in the borderline goods, relative factor supplies and countries' expenditures. Changes in the borderline goods may have opposite effects, such that it becomes more difficult to predict the direction of the change on relative wages that would follow the removal of import barriers. In the next section we present new econometric evidence on the role of trade liberalisation on relative wages in the manufacturing sectors.

3. Trade liberalisation and relative wages in Argentina: Further evidence from the 1990s⁶

The liberalisation of the Argentinean economy during the nineties induced important changes in relative prices. The labour market did not escape from these changes. A characteristic of the labour market during this period was the high rates of creation and destruction of jobs, which benefited skilled workers at the expense of unskilled ones (Aliaga and Montoya, 1998). Previous evidence on Argentina has shown an increase in the wage premium received by more skilled workers (Pessino, 1993 and 1995; Aliaga and Montoya, 1998). Figure 5 shows the evolution of relative wages for three groups of

⁵ By assumption E^{ld} and E^{de} are not affected by the domestic economy trade policy.

⁶ In order to make the results more comparable to those of Galiani and Sanguinetti (2003) the sample includes only workers categorised as employees.

workers, skilled, semi-skilled and unskilled, using two alternative criteria to distinguish among the three groups. Following what is usual in the literature, workers are assigned to each of the three groups according to the level of formal education, unskilled workers are those whose level of formal education is incomplete high school or less, semi-skilled workers are those with complete high school or incomplete tertiary/university education, whilst skilled workers are those that have finished a tertiary/university degree. The second criterion followed here depends on the characteristics required by the job. Workers performing a job which requires no qualification are classified as unskilled; those performing a job which requires an operative or technical qualification are considered as semi-skilled, while skilled workers are those employed in a job requiring a professional qualification. An advantage of this second classification is that we can expect it would reflect more accurately the payment scale. Of course, a close relationship between the two criteria is to be expected.⁷ A second reason to use this alternative classification, especially in the case of a country like Argentina which during the nineties experienced an important increase of unemployment rates, is that the use of formal educational to distinguish between workers has the drawback that, as unemployment rates increased workers with higher formal education found employment in jobs they were, a priori, overqualified for (see Table 1). In all cases, unless stated otherwise, the data used here refers to the hourly wage of workers living in the Area of Great Buenos Aires (GBA⁸), aged between 18 and 64 years old, who received a positive wage. The source of the data is the October wave of the Permanent Household Survey (EPH) carried out by the National Institute of Statistics and Census (INDEC).

⁷ For the period 1992-1999, of all workers classified as skilled according to their formal education, 48.4% were employed in jobs that required a professional qualification, 38.2% in jobs requiring a technical or operative qualification, while 13.4% were employed in jobs that required no qualification. For workers classified as semi-skilled according to their level of education the percentages were 6.3%, 29.3% and 64.5% respectively. Finally, for those that according to their education level are classified as unskilled the percentages were 1.0%, 6.7% and 92.3% respectively. If we restrict the attention to the manufacturing sectors only, the figures are quite similar, with the main change being that the percentage of people with a tertiary/university degree employed in jobs requiring no qualification was 25.2% instead of the 13.4% for all sectors altogether.

⁸ The GBA is composed of the City of Buenos Aires and its surrounding areas (Conurbano). It represents approximately 33% of the country population and 55% of the population covered by the Permanent Household Survey (EPH).

Table 1.A: Share of University/Tertiary Graduates employed in jobs requiring an operative or no qualification.

	All workers (*)		Employees	
	Manufactures	Services	Manufactures	Services
1992	22.77%	10.24%	25.57%	9.77%
1993	12.93%	11.01%	15.70%	10.03%
1994	25.84%	15.01%	20.30%	17.49%
1995	27.91%	11.49%	24.44%	12.93%
1996	29.20%	12.12%	30.36%	13.60%
1997	23.15%	11.76%	29.86%	14.47%
1998	23.64%	12.42%	24.33%	14.65%
1999	32.18%	13.78%	34.66%	15.94%
Change 1992-1999	41.31%	34.58%	35.54%	63.09%

(*) Includes employers, self-employed and employees

Table 1.B: Share of jobs requiring an operative or no qualification performed by University/Tertiary Graduates.

	All workers (*)		Employees	
	Manufactures	Services	Manufactures	Services
1992	1.30%	1.99%	1.47%	2.01%
1993	0.66%	1.77%	0.73%	1.64%
1994	2.09%	2.86%	1.52%	3.42%
1995	2.26%	2.32%	1.84%	2.52%
1996	2.09%	2.80%	1.68%	2.88%
1997	1.75%	2.72%	1.95%	3.14%
1998	1.62%	3.01%	1.42%	3.55%
1999	2.85%	3.10%	2.74%	3.63%
Change 1992-1999	119.18%	55.61%	85.72%	80.23%

(*) Includes employers, self-employed and employees

As we can see in Figure 5, in the case of the manufacturing sectors, the behaviour over the nineties is pretty unstable, especially when looking at the relative wage between skilled and semi-skilled workers, as well as between skilled and unskilled labour. In general, there was an increase in relative wages until the mid nineties with a reversion of this tendency during the second half of the decade. In the case of the relative wage between semi-skilled and unskilled workers, the figures are more stable, moreover, when the level of formal education is the criteria used to distinguish among workers, it is possible to observe a decreasing tendency in the relative wage between semi-skilled and

unskilled labour. When looking at relative wages in the service sectors, they are lower than those observed for manufactures. Here again, no clear pattern arises in the case of the relative wage between skilled and semi-skilled labour. On the other hand, the average wages for skilled and semi-skilled labour increased relative to that of unskilled labour. This increase is more important when workers are classified according to the requirements of the job they were employed in, especially in the case of the relative wage between semi-skilled and unskilled labour. This last finding goes in opposite direction to that observed for the manufactures.

Galiani and Sanguinetti (2003) analyse the effects of trade liberalisation on relative wages in manufactures by estimating an extended Mincer-type equation which includes sectorial import and export penetration ratios⁹. Workers are classified among three skill groups according to their formal education level (see above). They found that an increase in import ratios raises the wage of skilled labour relative to both semi-skilled and unskilled labour. However, the change in the wage premium of skilled labour explained by changes in imports is just a small fraction of the observed changes.

⁹ Sectors correspond to the 2-digit ISIC Revision 3 classification.

Figure 5.A: Relative Wages in Great Buenos Aires. All workers: employers, self-employed and employees.

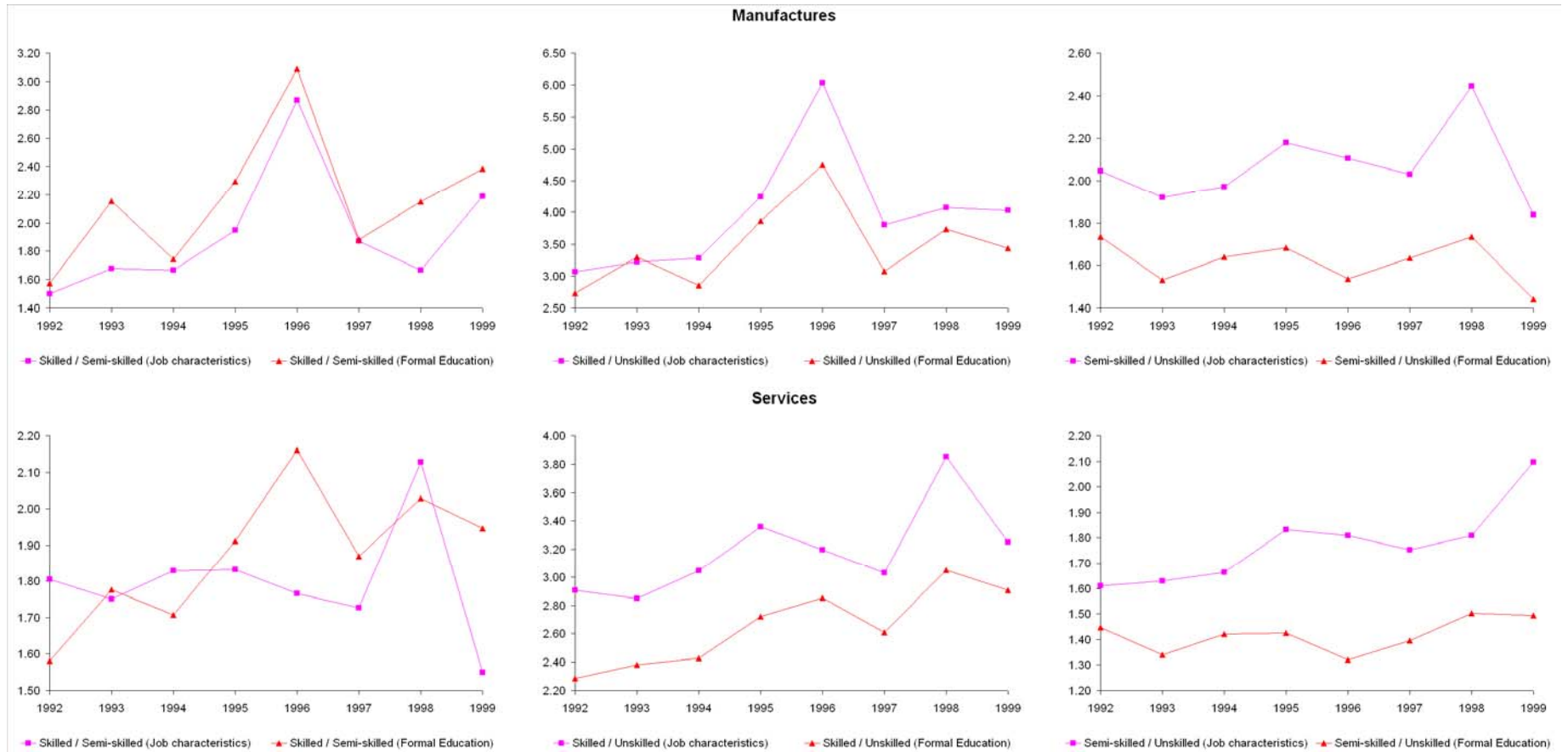
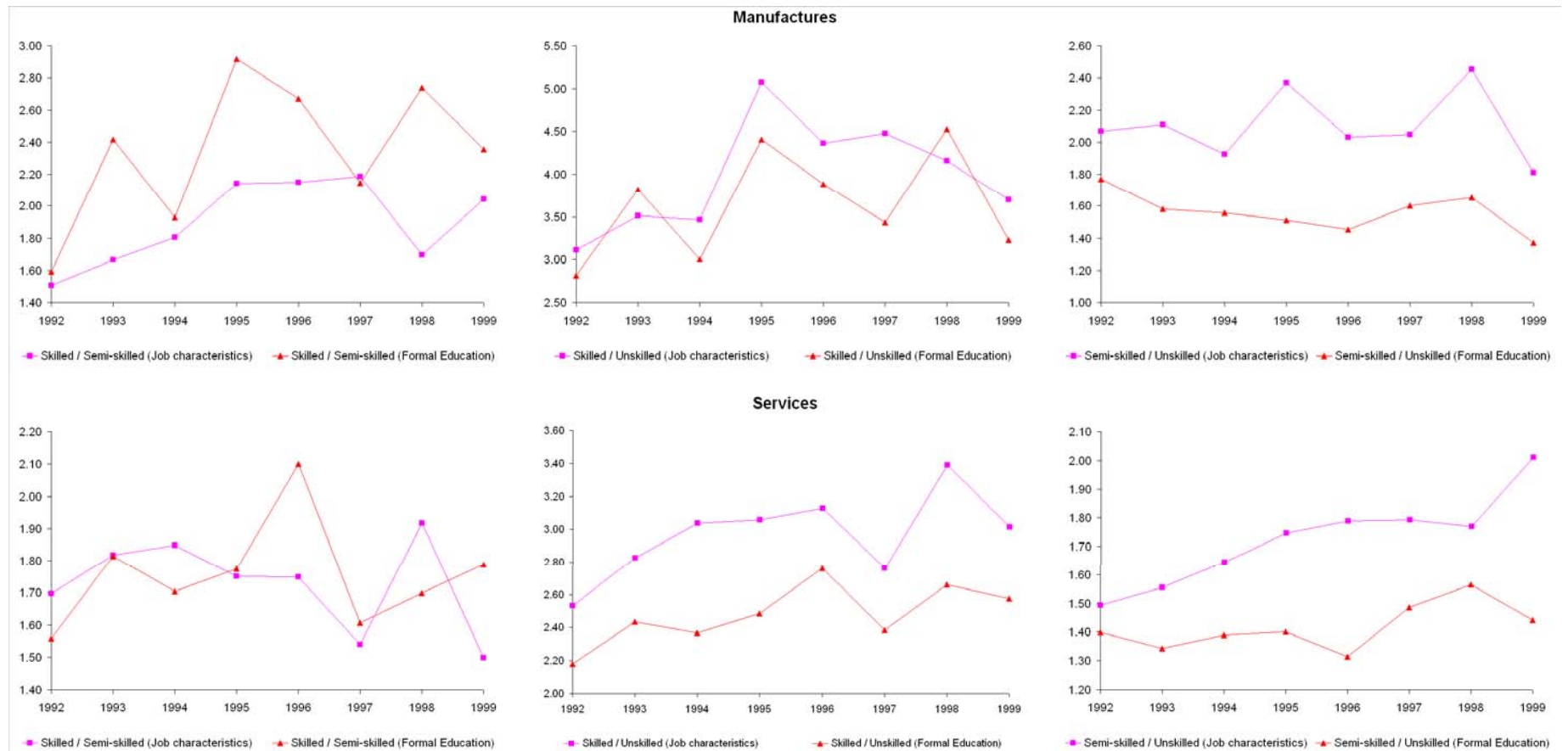


Figure 5.B: Relative Wages in Great Buenos Aires. Employees.



As a first extension of Galiani and Sanguinetti (2003) we estimate their extended Mincer-type equation but in this case workers are classified according to the requirements of the job they are employed in. Like before we consider three groups: (a) skilled labour: workers employed in a job requiring a professional qualification; (b) semi-skilled labour: workers performing a job which requires an operative or technical qualification; (c) unskilled labour: workers employed in a job requiring no qualification. More specifically, the equation we estimate is the following:

$$\ln(w_{i,s,t}) = \beta_t + \phi_s + \chi_t dsex_i + \gamma_t age_{i,t} + \delta_t age_{i,t}^2 + \sum_{TE=2}^5 \lambda_{TE,t} d_{TE} + \alpha d_{BsAs} \quad (1)$$

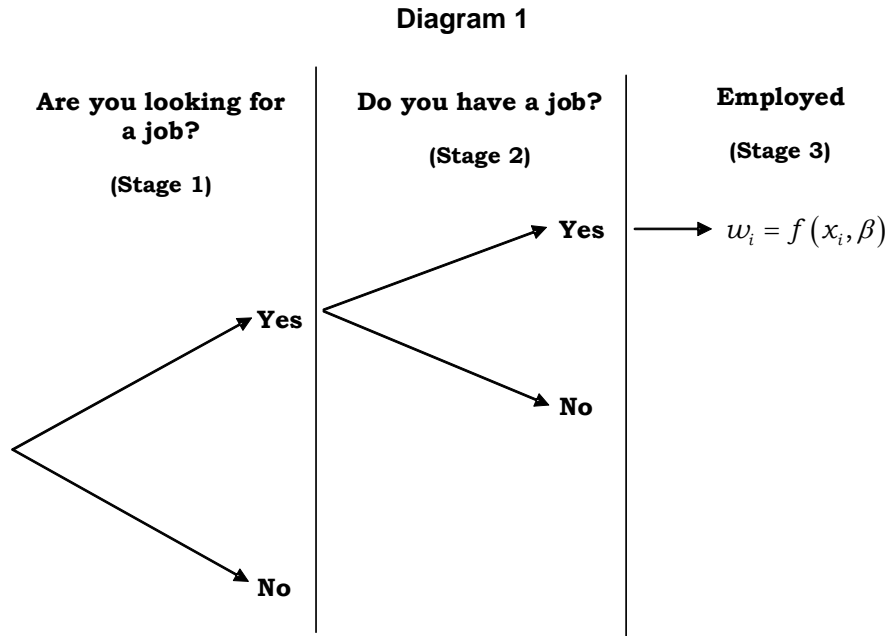
$$+ \sum_{g=SE,S} \theta_{g,t} d_g + \sum_{g=U,SE,S} \psi_g d_g m_{s,t} + \sum_{g=U,SE,S} \eta_g d_g x_{s,t} + u_{i,s,t}$$

where:

- i : individual;
- w : hourly wage in main occupation;
- $dsex$: gender dummy (male=1);
- AGE : age in years;
- d_{TE} : tenure dummies. Tenure is measured in years. The tenure groups are: [0,1), [1,5), [5,10), [10,20), [20,+];
- d_g : dummies for semi-skilled (SE) and skilled (S) workers. Unskilled (U) workers are the group of reference;
- d_{BsAs} : dummy equal 1 if individual i lives in the city of Buenos Aires.
- $m_{s,t}$ and $x_{s,t}$ are the natural logarithms of the ratios of imports and exports, respectively, to gross production in sector s person i is employed in.

Before going to the results, a point to take into account is the potential problem of sample selection bias since equation (1) is estimated using household survey data, which means we do not have data on the continuous dependent variable for the entire

population, but just only for employed people¹⁰. Diagram 1 shows the situation we are dealing with.



Following Tunali (1986), in order to control for the problem of sample selection bias, we would need to simultaneously estimate the following system of equations:

$$y_{1i}^* = \beta_1' x_{1i} + u_{1i} \quad \text{labour participation rule} \quad (\text{a.1})$$

$$y_{2i}^* = \beta_2' x_{2i} + u_{2i} \quad \text{employment equation} \quad (\text{a.2})$$

$$y_{3i} = \beta_3' x_{3i} + \sigma_3 u_{3i} \quad \text{earning equation} \quad (\text{a.3})$$

where the x_{ji} 's are $K_j \times 1$ vectors of explanatory variables, β_j 's are $K_j \times 1$ vectors of unknown coefficients, and σ_3 is an unknown scale parameter. The errors terms are assumed to be normally distributed, with zero mean and the following correlation matrix:

¹⁰ Aliaga and Montoya (1998) analyze the evolution of wage premiums between 1990 and 1998 including a double selection criterion, correcting for the probability of a person participating of the labour market, combined with the probability of being employed for those who decide to look for a job. Their results suggest the existence of a sample selection problem.

$$\Sigma = \begin{bmatrix} 1 & \rho_{12} & \rho_{13} \\ \rho_{12} & 1 & \rho_{23} \\ \rho_{13} & \rho_{23} & 1 \end{bmatrix}$$

If both, people not looking for a job and unemployed people were a random draw of the entire sample there would be no sample selection bias and equation (a.3) can be estimated independently of (a.1) and (a.2), in this case, and if all other necessary assumptions to apply Least Squares are met, the estimated vector $\hat{\beta}_3$ is an unbiased estimation of the true vector β_3 . On the other hand, if there is a sample selection bias problem, the estimated coefficients for the wage equation, when (a.3) is estimated without considering (a.1) and (a.2), are not unbiased.

The problem with the estimation of system (a.1)-(a.3) is that y_{1i}^* (the propensity to participate) and y_{2i}^* (the propensity to be employed) are not directly observable. Instead we observe two binary variables depending on the person participating or not, and for those who participate, if they have or not a job:

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (\text{individual } i \text{ is looking for a job})$$

Then, for those observations with $y_{1i} = 1$ we have:

$$y_{2i} = \begin{cases} 1 & \text{if } y_{2i}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (\text{individual } i \text{ has a job})$$

Under this structure, the expected value of y_{3i} becomes (Tunali. 1986):

$$\begin{aligned} E(y_{3i} | y_{1i} = 1, y_{2i} = 1) &= \beta_3' x_{3i} + \sigma_3 E[u_{3i} | u_{1i} > -\beta_1' x_{1i}, u_{2i} > -\beta_2' x_{2i}] \\ &= \beta_3' x_{3i} + \gamma_1 \lambda_{1i} + \gamma_2 \lambda_{2i} + \sigma_3 v_{3i} \end{aligned} \quad (\text{a.4})$$

where:

$$\gamma_1 = \sigma_3 \rho_{13}$$

$$\gamma_2 = \sigma_3 \rho_{23}$$

$$\lambda_{1i} = \frac{\phi_1(\beta_1' x_{1i}) \Phi_1\left(\frac{\beta_2' x_{2i} - \rho_{12} \beta_1' x_{1i}}{(1 - \rho_{12}^2)^{1/2}}\right)}{\Phi_2(\beta_1' x_{1i}, \beta_2' x_{2i}, \rho_{12})}$$

$$\lambda_{2i} = \frac{\phi_1(\beta_2' x_{2i}) \Phi_1\left(\frac{\beta_1' x_{1i} - \rho_{12} \beta_2' x_{2i}}{(1 - \rho_{12}^2)^{1/2}}\right)}{\Phi_2(\beta_1' x_{1i}, \beta_2' x_{2i}, \rho_{12})}$$

$$v_{3i} = u_{3i} - \rho_{13} \lambda_{1i} - \rho_{23} \lambda_{2i}$$

and ϕ_g and Φ_g stand for the standard g-variate normal pdf and cdf respectively. As it is clear from (a.4), failing to correct for a sample selection problem means the model would suffer of truncation bias since we do not control for the non-zero conditional expectation of the disturbance term u_{3i} (Duncan, 2003).

λ_{1i} and λ_{2i} are usually know as the inverse Mill's ratios (IMR). The reason to introduce the IMRs is to control for the bias attributed to the likelihood of individual i participating in the labour market, and for those who participate, for the likelihood of having a job. If the estimated coefficients for γ_1 and γ_2 are statistically different than zero the null hypothesis of no sample selection bias can be rejected.

Proceeding in this way we are able to obtain unbiased estimates of the vector β_3 . However, as it is possible to realise, the inclusion of λ_1 and λ_2 into (a.4) introduces a source of heteroscedasticity since λ_1 and λ_2 are functions of x_{1i} and x_{2i} . Additionally, since the IMRs are not directly observed but estimated, another source of heteroscedasticity arises. Equation (a.4) becomes:

$$E(y_{3i} | y_{1i} = 1, y_{2i} = 1) = \beta_3' x_{3i} + \gamma_1 \hat{\lambda}_{1i} + \gamma_2 \hat{\lambda}_{2i} + \tilde{v}_{3i} \quad (\text{a.5})$$

where:

$$\hat{\lambda}_{1i} = \frac{\phi_1(\hat{\beta}'_1 x_{1i}) \Phi_1\left(\frac{\hat{\beta}'_2 x_{2i} - \hat{\rho}_{12} \hat{\beta}'_1 x_{1i}}{(1 - \hat{\rho}_{12}^2)^{1/2}}\right)}{\Phi_2(\hat{\beta}'_1 x_{1i}, \hat{\beta}'_2 x_{2i}, \hat{\rho}_{12})}, \quad \hat{\lambda}_{2i} = \frac{\phi_1(\hat{\beta}'_2 x_{2i}) \Phi_1\left(\frac{\hat{\beta}'_1 x_{1i} - \hat{\rho}_{12} \hat{\beta}'_2 x_{2i}}{(1 - \hat{\rho}_{12}^2)^{1/2}}\right)}{\Phi_2(\hat{\beta}'_1 x_{1i}, \hat{\beta}'_2 x_{2i}, \hat{\rho}_{12})}$$

and $\tilde{v}_{3i} = u_{3i} - \rho_{13}(\lambda_{1i} - \hat{\lambda}_{1i}) - \rho_{23}(\lambda_{2i} - \hat{\lambda}_{2i})$.

A second problem generated by the inclusion of the IMRs is that the standard errors for the vector $\hat{\beta}_3$ need to be corrected, despite this they are still not efficient, that is they do not have minimum variance among unbiased estimators (Duncan, 2003).^{11,12}

In order to obtain the two IMRs a bi-probit model with sample selection is estimated by maximum-likelihood, where the dependent variables are y_{1i} and y_{2i} . The explanatory variables used in the employment equation (a.2) are: age, age², a dummy equal to 1 if individual i is male, 6 dummy variables to control for formal education: incomplete or complete primary, high and superior (the control group is no education). In the case of the participation equation (a.1), in addition to the former variables, 4 other dummies are used describing the relationship between each member of the household and the household's head (spouse, son/daughter, brother/sister, others), another 4 variables are constructed by the interaction of the former 4 dummies and a dummy describing the labour status of the head of the household (=1 if employed, =0 otherwise), finally, other 4 variables are constructed by the interaction of two dummies for male and

¹¹ In all the results reported below we do not correct standard errors. Green (2003, pp 784-785) reports the formula to correct standard errors in the case of one selection equation. However, as advised by Insan Tunali, the use of robust standard errors appears to work well in practice.

¹² Alternatively, we can use maximum likelihood. In this case the likelihood function, following Tunali (1986), is:

$$L = \prod_{y_{1i}=0} \Phi(-\beta'_1 x_{1i}) \prod_{\substack{y_{1i}=1 \\ y_{2i}=0}} \Phi_2(\beta'_1 x_{1i}, -\beta'_2 x_{2i}, -\rho_{12}) \prod_{\substack{y_{1i}=1 \\ y_{2i}=1}} \int_{-\beta'_2 x_{2i} - \beta'_1 x_{1i}}^{\infty} \int_{-\beta'_1 x_{1i}}^{\infty} \frac{1}{\sigma_3} \phi_3\left(u_{1i}, u_{2i}, \frac{y_{3i} - \beta'_3 x_{3i}}{\sigma_3}\right) du_{1i} du_{2i}$$

One advantage of using maximum likelihood is that we can get consistent estimates of all the model parameters without the need to correct the covariance matrix of $\hat{\beta}_3$, neither the standard error of the wage equation, however, on the other hand the complexity of the likelihood function make this procedure difficult given the large number of variables used here.

female, and the total number of sons/daughters, and the number of sons/daughters who are 6 or less years old. In both equations 7 time dummies are used (1993 to 1999).

Table 2 reports the results for alternative specifications of equation (1). From the results we have that the coefficients for import penetration ratios are always positive and statistically significant in the case of skilled labour, for the other two groups they are in all cases not significant. In the case of export ratios the estimated coefficients are positive and significant in the case of semi-skilled labour.

Table 2: Impact of trade ratios on nominal wages by skill group (equation (1)).

Variable	(1)	(2)	(3)
ln(imports)*skilled	0.1219* (0.0665)		0.1199* (0.0664)
ln(imports)*semi-skilled	0.0138 (0.0566)		0.0103 (0.0572)
ln(imports)*unskilled	0.0263 (0.0542)		0.0245 (0.0547)
ln(exports)*skilled		0.1121 (0.0760)	0.0985 (0.0734)
ln(exports)*semi-skilled		0.0811* (0.0467)	0.0905* (0.0469)
ln(exports)*unskilled		0.0086 (0.0339)	0.0116 (0.0343)
Observations	4861	4861	4861
Adjusted R-squared	0.858	0.858	0.859

Robust standard errors in parentheses. * The coefficient is statistically different from zero at the 10% significance level.

Besides the statistical significance of the estimated coefficients, our concern here is whether the differences among the coefficients for the three skill groups are statistically different from zero, if this is indeed the case then changes in trade ratios would have an effect on relative wages. In Table 3 we report the results from the F-tests on the equality of the coefficients. As shown there, an increase in import ratios raises the wage premium of skilled labour relative to the other two skill groups, while they do not affect the relative wage between semi-skilled and unskilled labour. When looking at the effect of changes in export ratios, an increase of them raises the wage premium between semi-skilled and unskilled labour. These results mean that in the case of imports they are similar to those

of Galiani and Sanguinetti (2003). On the other hand, in the case of exports they found no significant effect.

Table 3: Imports and export effects on relative wages. F tests for equality of coefficients.

	Skilled - Semi-skilled	Skilled - Unskilled	Semi-skilled - Unskilled
Imports	$\psi_{skilled} - \psi_{semi-skilled} = 0.1081$	$\psi_{skilled} - \psi_{unskilled} = 0.0956$	$\psi_{semi-skilled} - \psi_{unskilled} = -0.0125$
	F(1,4759) = 7.07 Prob > F = 0.0078	F(1,4759) = 6.32 Prob > F = 0.0120	F(1,4759) = 0.31 Prob > F = 0.5788
Exports	$\eta_{skilled} - \eta_{semi-skilled} = 0.0310$	$\eta_{skilled} - \eta_{unskilled} = 0.1035$	$\eta_{semi-skilled} - \eta_{unskilled} = 0.0725$
	F(1,4759) = 0.17 Prob > F = 0.6834	F(1,4759) = 2.17 Prob > F = 0.1403	F(1,4759) = 4.17 Prob > F = 0.0412
Imports	$\psi_{skilled} - \psi_{semi-skilled} = 0.1096$	$\psi_{skilled} - \psi_{unskilled} = 0.0954$	$\psi_{semi-skilled} - \psi_{unskilled} = -0.0142$
	F(1,4756) = 7.37 Prob > F = 0.0067	F(1,4756) = 6.47 Prob > F = 0.0110	F(1,4756) = 0.40 Prob > F = 0.5263
Exports	$\eta_{skilled} - \eta_{semi-skilled} = 0.0081$	$\eta_{skilled} - \eta_{unskilled} = 0.0869$	$\eta_{semi-skilled} - \eta_{unskilled} = 0.0789$
	F(1,4756) = 0.01 Prob > F = 0.9122	F(1,4756) = 1.69 Prob > F = 0.1940	F(1,4756) = 4.90 Prob > F = 0.0269

A characteristic of equation (1) is that given the sign of the difference among the coefficients for the explanatory variables (trade ratios), the direction of the effect on relative wages produced by a change in a given explanatory variable is the same independently of the sectors these changes occur¹³. Galiani and Sanguinetti in a previous draft of their 2003 paper, justify equation (1) using a 3-good and 2-factor model where traded goods (manufactures), either exportable or importable, are unskilled-intensive while non-traded goods (services) are skill-intensive. Under these assumptions they show that the reduction in the price of one of the traded goods raises the relative wage of skilled labour.

In despite of in the aggregate the assumption that no-traded goods (services) are more skill-intensive than manufactures may be an accurate description for Argentina, there exist a large heterogeneity across the different non-traded sectors, a quite stylised description would be one where services are located at both extremes of the skill-intensity

¹³ The magnitude of the effect may differ across sectors if changes in trade ratios are not the same.

range, while manufactures are somewhat in the middle. This pattern is especially appealing in the case of a country like Argentina, which as described above has a lower relative abundance of skilled labour when comparing with most developed countries but a higher relative abundance when comparing with other developing countries. As pointed out before, a potentially useful hypothesis in this case is that of Wood (1995 and 1997), who suggests that in some cases the reduction of trade barriers may induce to a contraction of sectors both of high and low skill intensity, being not possible to predict a priori the effects on relative factor returns. To explore this possibility, equation (1) is extended such that the effect of trade ratios are allowed to vary across sectors depending on the skill-intensity of production of sector s person i is employed in. In particular, equation (1) is modified as follow:

$$\begin{aligned} \ln(w_{i,s,t}) = & \beta_t + \phi_s + \chi_t dsex_i + \gamma_t age_{i,t} + \delta_t age_{i,t}^2 + \sum_{TE=2}^5 \lambda_{TE,t} d_{TE} + \sum_{g=SE,S} \theta_{g,t} d_g + \alpha d_{BsAs} \\ & + \sum_{g=U,SE,S} \varphi_g^{sk-intensive} d_g m_{s,t}^{sk-intensive} + \sum_{g=U,SE,S} \varphi_g^{unsk-intensive} d_g m_{s,t}^{unsk-intensive} \\ & + \sum_{g=U,SE,S} \xi_g^{sk-intensive} d_g x_{s,t}^{sk-intensive} + \sum_{g=U,SE,S} \xi_g^{unsk-intensive} d_g x_{s,t}^{unsk-intensive} + u_{i,s,t} \end{aligned} \quad (3)$$

where the superscripts “sk-intensive” and “unsk-intensive” refer to skill-intensive and unskilled-intensive sectors¹⁴. Table 4 reports the results from equation (2), while Table 5 presents the results from the F-tests on the equality of the coefficients among the three skill labour groups.

¹⁴ To classify each of the 2-digit manufacturing sectors of the ISIC Revision 3 classification we adapted Worz (2005) typology based on the Revision 2 of the same classification.

Table 4: Impact of trade ratios on nominal wages by skill group (equation (2)).

Variable	(1)	(2)	(3)
ln(imports)*skilled*skill-intensive	0.1544* (0.0807)		-0.0191 (0.1155)
ln(imports)*semi-skilled*skill-intensive	0.0466 (0.0722)		0.0067 (0.0912)
ln(imports)*unskilled*skill-intensive	0.0586 (0.0706)		0.0084 (0.0863)
ln(imports)*skilled*unskilled-intensive	0.0848 (0.0748)		0.1136 (0.0738)
ln(imports)*semi-skilled*unskilled-intensive	-0.0020 (0.0613)		-0.0114 (0.0624)
ln(imports)*unskilled*unskilled-intensive	0.0037 (0.0573)		0.0060 (0.0576)
ln(exports)*skilled*skill-intensive		0.2505*** (0.0947)	0.3622** (0.1518)
ln(exports)*semi-skilled*skill-intensive		0.1291** (0.0647)	0.1211 (0.0864)
ln(exports)*unskilled*skill-intensive		0.0674 (0.0527)	0.0642 (0.0609)
ln(exports)*skilled*unskilled-intensive		0.0843 (0.0749)	0.0425 (0.0748)
ln(exports)*semi-skilled*unskilled-intensive		0.0649 (0.0473)	0.0788 (0.0503)
ln(exports)*unskilled*unskilled-intensive		-0.0075 (0.0346)	-0.0043 (0.0368)
Observations	4861	4861	4861
Adjusted R-squared	0.858	0.858	0.859

Robust standard errors in parentheses. * The coefficient is statistically different from zero at the 10% significance level. **The coefficient is statistically different from zero at the 5% significance level. ***The coefficient is statistically different from zero at the 1% significance level.

The main picture emerging from Table 5 is coherent with what can be expected a priori, increasing levels of unskilled-intensive imports raise the wage of skilled labour relative to the other two groups, while an increase of skill-intensive exports raises the relative wage between skilled and unskilled labour. On the other hand, an increase in exports by unskilled-intensive sectors favours semi-skilled workers with respect to unskilled ones. An interesting result emerging from the data is that the main force behind the changes in relative wages works through changes in exports than through changes in imports. For instance, the changes in import penetration ratios of unskilled-intensive sectors between 1992 and 1999 would have induced to a 5.13% increase in the wage of

skilled labour relative to semi-skilled labour, and a 4.4% relative to unskilled labour. On the other hand, in the case of export ratios for skill-intensive sectors, the induced changes would have been 14.8% and 18.6% respectively. However, because skill-intensive sectors represent less approximately just one third of the total number of employees in manufactures, the aggregate effect reduces appreciably.

5. Summary and conclusions

As stated before, some recent studies on the effects of trade liberalisation on relative wages in Argentina have found that it has played a relative minor role in explaining the increasing levels of wage inequality, with technical change playing a more important role. The explanation behind these results is that in the case of Argentina, both exports and imports are more unskilled-intensive than non-tradable sectors whilst new capital incorporated during the 1990s has been complement of skilled labour.

Wood (1997) argues that in a world with many goods and countries, where countries specialise in the production of a limited number of goods, trade liberalisation by countries with an intermediate abundance of skilled labour favours the production of sectors with intermediate skill-intensity, shrinking that of both high and low skill-intensive sectors. Since the effects of these two changes work in opposite directions, it becomes more difficult to predict the net effect on relative wages. Also, as these opposite effects tend to compensate each other, the aggregate effect could be expected to be rather small.

The new evidence for the period 1992-1999, presented in section 4, confirmed that for the aggregate of the economy the role of trade liberalisation has been relatively small. In our case this outcome is justified by the presence of opposite effects that are a function of the degree of skill-intensity of trade flows. More specifically, we found the raise in the wage premium of skilled labour worked mostly through the increase of skill-intensive exports than through changes in imports which are intensive in unskilled labour.

Table 5: Imports and export effects on relative wages according to skill-intensity of production. F tests for equality of coefficients. (Column 3 Table 4)

	Skilled – Semi-skilled	Skilled – Unskilled	Semi-skilled - Unskilled
Imports – Skill-intensive sectors	$\varphi_{skilled}^{sk-intensive} - \varphi_{semi-skilled}^{sk-intensive} = -0.0258$ F(1,4750) = 0.10 Prob > F = 0.7570	$\varphi_{skilled}^{sk-intensive} - \varphi_{unskilled}^{sk-intensive} = -0.0275$ F(1,4750) = 0.13 Prob > F = 0.7226	$\varphi_{semi-skilled}^{sk-intensive} - \varphi_{unskilled}^{sk-intensive} = -0.0017$ F(1,4750) = 0.00 Prob > F = 0.9694
Imports – Unskilled-intensive sectors	$\varphi_{skilled}^{unsk-intensive} - \varphi_{semi-skilled}^{unsk-intensive} = 0.1251$ F(1,4750) = 6.21 Prob > F = 0.0127	$\varphi_{skilled}^{unsk-intensive} - \varphi_{unskilled}^{unsk-intensive} = 0.1076$ F(1,4750) = 5.47 Prob > F = 0.0194	$\varphi_{semi-skilled}^{unsk-intensive} - \varphi_{unskilled}^{unsk-intensive} = -0.0175$ F(1,4750) = 0.35 Prob > F = 0.5525
Exports – Skill-intensive sectors	$\zeta_{skilled}^{sk-intensive} - \zeta_{semi-skilled}^{sk-intensive} = 0.2410$ F(1,4750) = 2.53 Prob > F = 0.1120	$\zeta_{skilled}^{sk-intensive} - \zeta_{unskilled}^{sk-intensive} = 0.2980$ F(1,4750) = 4.41 Prob > F = 0.0358	$\zeta_{semi-skilled}^{sk-intensive} - \zeta_{unskilled}^{sk-intensive} = 0.0570$ F(1,4750) = 0.56 Prob > F = 0.4550
Exports – Unskilled-intensive sectors	$\zeta_{skilled}^{unsk-intensive} - \zeta_{semi-skilled}^{unsk-intensive} = -0.0363$ F(1,4750) = 0.24 Prob > F = 0.6259	$\zeta_{skilled}^{unsk-intensive} - \zeta_{unskilled}^{unsk-intensive} = 0.0468$ F(1,4750) = 0.48 Prob > F = 0.4862	$\zeta_{semi-skilled}^{unsk-intensive} - \zeta_{unskilled}^{unsk-intensive} = 0.0832$ F(1,4750) = 4.95 Prob > F = 0.0261

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