

*Trade Liberalization, Inequality and Poverty Reduction in Latin America\**

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ABSTRACT

Trade liberalization in the late eighties and early nineties in Latin America was accompanied by increases in skill premiums and wage inequality, and in several countries in overall income inequality, a result unexpected by many. Further, as shown in the paper, observed effects on poverty varied widely across countries where wage and income inequality increased or remained essentially unchanged. This paper argues that this was mainly the result of four factors: (1) relative factor endowments, as most Latin American countries are rich in natural resources (which, are in general complementary with capital and skills) and were more capital abundant than other developing countries with large pools of unskilled labor, such as China and India, that were already integrating into the world economy by the time of Latin American trade liberalization; (2) dynamic effects of trade that led to an acceleration of skill-biased technical change and Schumpeterian creative destruction, which led to an increase in demand for skills in most industries; (3) initial conditions and contemporary events that make predictions based on a simple factor abundance model difficult to generalize; for example the pre-reform structure of protection was biased towards unskilled intensive sectors in most LAC countries and tariff reductions naturally led to a relative increase in demand for skills, but differences in consumption bundles across income groups and exchange rate policies also complicate predictions; (4) the impact that trade reform had on imperfectly functioning labor markets, such as potential transitions in and out of unemployment, informality, as well as income volatility are likely to affect and sometimes change the direction of the impact of trade reforms on income inequality and poverty. Finally, the paper shows that the effect of trade on poverty (and income inequality) depends largely on other policies being implemented simultaneously, and that the impact of trade on poverty reduction can be significantly enhanced (and the effects on inequality mitigated) by policies that increase the provision and access to skills and other productive assets for the poor.

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## 1. Introduction

Trade reforms in Latin America have been often associated, in the popular debate, with increases in income inequality, poverty and skill premiums, while many in the economics profession, based on the Heckscher-Ohlin framework and the Stolper-Samuelson theorem, expected trade liberalization in developing countries to reduce income inequality through an increase in the relative demand for unskilled-labor intensive activities and thus for unskilled labor (the presumed abundant endowment of developing countries). This paper reviews the facts, attempts to explain the apparent puzzles and explores what governments can do to ensure that international trade can be used as an instrument for poverty reduction.

These issues are important, not only for equity and socio/political reasons, as growing inequality can lead to social and political tensions and eventually the reversal of reforms, but also because increases in income inequality and poverty can be associated with lower growth (e.g., Aghion, Caroli and Penalosa, 1999, Azaridis and Stachursky, 2005, Perry, Lopez, Maloney, Arias and Serven, 2005). As this literature emphasizes, in the presence of poverty traps or market failures (e.g., absence of access to credit or insurance), inequality and poverty increasing trade reforms can lead to lower growth if resources cannot be reallocated to more productive use and inefficiencies get exacerbated.

If the impact of trade policy on aggregate welfare is not straightforward in the presence of poverty traps or market failures, the distributional impacts of trade liberalization are even more problematic as it is clear that trade can generate losses to some agents and gains to others. In the presence of effective distributive policies (taxes, subsidies and transfers), it would be possible, in principle, to redistribute the overall gains –if any— so as to achieve Pareto efficiency. In the absence of such effective redistributive policies, as it is the case in Latin America where the tax and transfer systems accomplish little redistribution (Perry, Lopez, Maloney, Arias and Serven, 2005), both because of administrative and political economy constraints, little can be said about the welfare implications of trade in general terms. In consequence, whether trade openness will benefit poor households becomes an empirical question and data analysis is needed to provide clues regarding the impacts of trade across different households.

This paper examines these issues in the context of the trade liberalization episodes that took place in most countries of Latin America from the mid eighties (Chile<sup>1</sup> and Mexico) to the early nineties (Figure 1.1). The paper is organized as follows.

Section 2 begins by reviewing the evidence on the effects of these trade reform episodes on income inequality, wage inequality, skill premiums and demand for skills. It then turns to examine the impact of three factors that help explain the apparent puzzles. First, Latin American relative factor endowments, specifically the extent to which the region should

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<sup>1</sup> Chile first liberalized in 1975-6, though this was followed by backtracking after the debt crisis during 1983-1985 and liberalization since then. For the purposes of graphs showing developments before and after liberalization we are using 1985 here as the date of definitive liberalization. Similarly, we are using 1989 as the date for Argentina's definitive liberalization and not the late seventies failed liberalization.

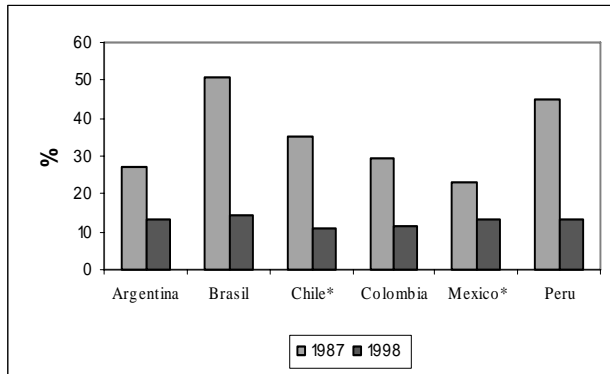
be characterized as relatively abundant in natural resources and with intermediate capital abundance, specially in comparison with countries with large pools of unskilled labor, such as China and India, that were already integrating into the world economy by the time of Latin American trade liberalization. Second, dynamic effects of trade that could accelerate skill-biased technical change and Schumpeterian creative destruction, which led to an increase in demand for skills in most industries. Third, the fact that previously protected sectors were generally more unskilled intensive and thus tariff reductions could lead naturally to a relative increase in demand for skills. Section 2 also examines the differential effects by income groups of the fall in the cost of consumption bundles associated with trade liberalization and briefly discusses Government reactions to the fiscal effects of trade liberalization..

Section 3 focuses on the impact of trade reform on the real incomes of the poorest individuals. It also discusses additional effects on labor incomes, such as potential impacts on transitions in and out of unemployment and informality, as well as labor income volatility in specific countries

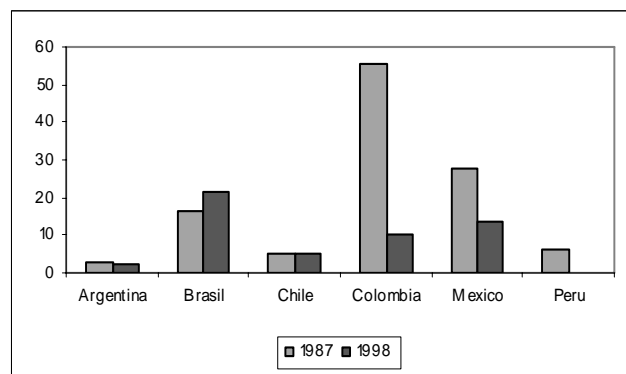
Section 4 analyzes the importance of policy complementarities in ensuring that the poor benefit from trade reforms. Section 5 offers some concluding remarks.

**Figure 1.1**  
**Trade openness indicators**

**A. Average Tariffs ( % unweighted)**



**B. Quantitative Restrictions**



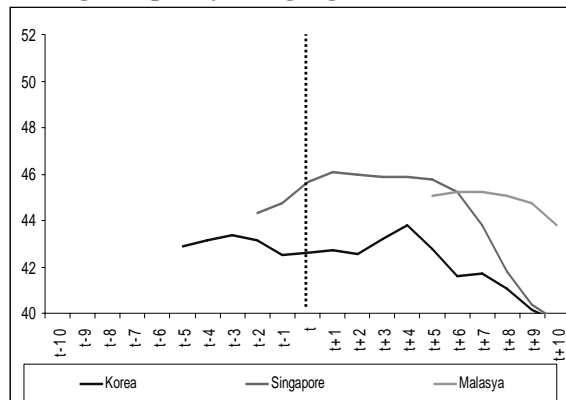
Source: Perry, Lederman and Suescun (2002). "Trade Structure, Trade Policy and Economic Policy Options in Central America"

## 2. Trade Opening and Inequality: Latin America’s “puzzle”?

Many economists, following the predictions of neoclassical Heckscher-Ohlin trade models and especially the Stolper-Samuelson theorem (HO/SS from now on), expected trade liberalization in developing countries to reduce income inequality through an increase in the relative demand for unskilled labor. Furthermore, under the assumption that capital and skills are complements, trade liberalization was expected to reduce skill premiums and hence wage income inequality. In the case of the Asian Tigers’ trade liberalization episodes in the sixties, wage inequality declined or remained constant after trade liberalization, though this was not the case for overall household income inequality (Figure 2.1).<sup>2</sup>

**Figure 2.1**  
Income and wage inequality before and after the trade liberalization – East Asian Tiggers

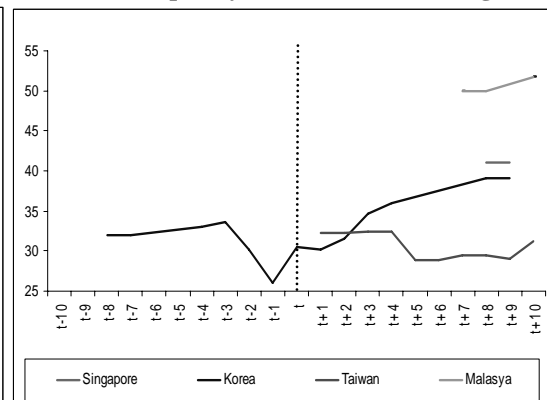
### A. Wage inequality – wages ginis



Source: University of Texas inequality project.

Note: inequality in wages computed from a regression relationship between the Deininger & Squire inequality reforms measures and the UTIP-UNIDO pay inequality measures controlling for the source characteristics in the D&S data and for the share of manufacturing in total employment. Time at which trade reforms starts is from Wacziarg and Welch (2003).

### B. Income inequality – household income ginis



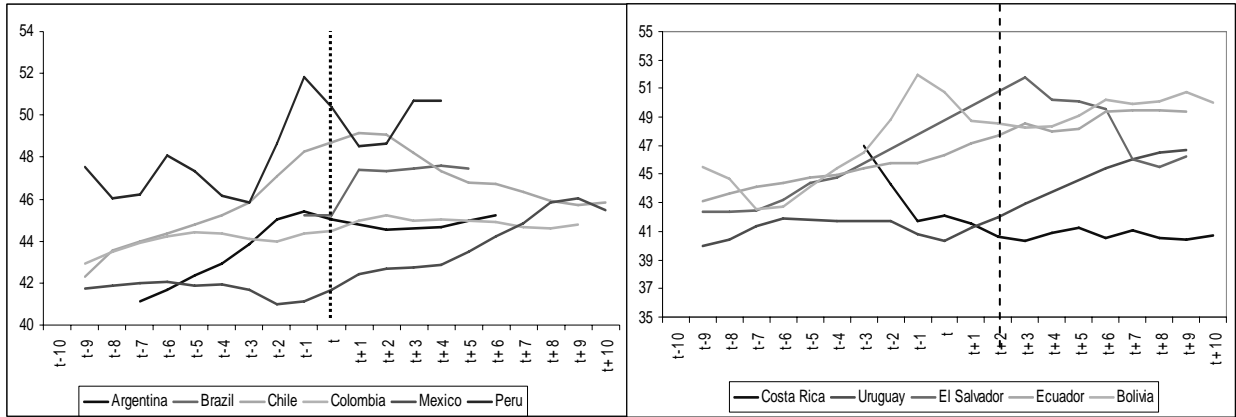
Source: Dollar and Kray (2003, JEG) and De Ferranti, Perry, Ferreira y Walton (2003). “Inequality in Latin America Breaking with history?”. Time at which trade liberalization occurs is from Wacziarg and Welch (2003).

Many analysts also expected reductions in inequality and skill premiums when most Latin American countries sharply reduced their tariffs and non-tariff trade barriers in the mid eighties and beginning of the nineties, although several previous empirical studies (*Krueger (1978), Bhagwati (1978), Choksi, Michaely and Papageorgiu (1991)*) had not found a consistent relation between trade liberalization in developing countries and domestic income distribution. What was observed in Latin America, though, was an increase in wage inequality (with some exceptions) and skill premiums (between workers with tertiary and secondary education) and in many cases also an increase in overall income inequality (Figure 2.2).

<sup>2</sup> The only skill premium data we could obtain for the East Asian Tigers starts in 1983 ; more than a decade after the Asian Tigers liberalize. It suggests though a decline in skill premium for Korea and relative stables skill premiums for Singapore and Hong Kong from 1983 onwards (see Dirk Willem te Velde and Oliver Morrissey (2002). “Foreign Direct Investment, Skills and Wage Inequality in East Asia”)

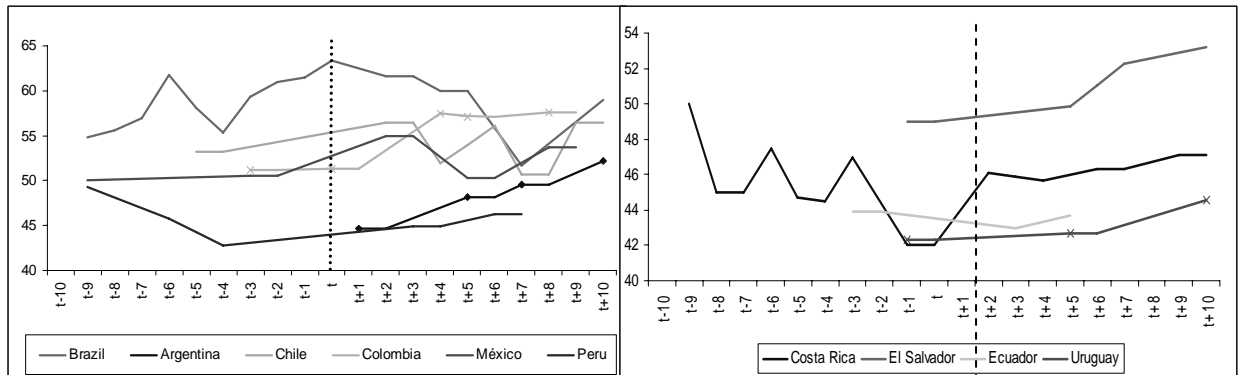
**Figure 2.2**  
**Skill Premiums, Wage Inequality and Income Inequality before and after trade liberalization in LAC**

**A. Wage Inequality (Gini index)**



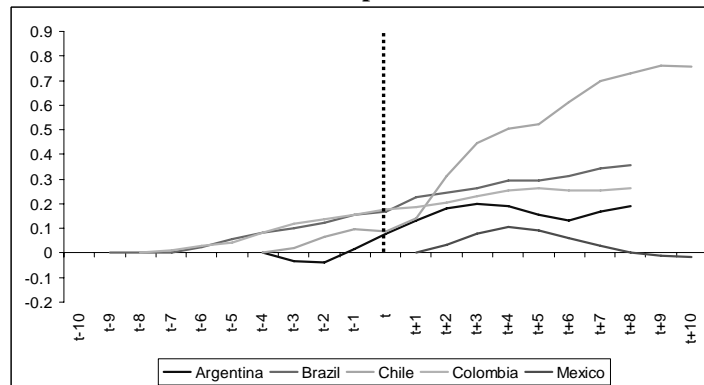
Source: University of Texas inequality project. Inequality in wages computed from a regression relationship between the Deininger & Squire measures and the UTIP-UNIDO pay inequality measures controlling for the source characteristics in the Deininger and Squire data and for the share of manufacturing in total employment. Time at which trade liberalization occurs is from Wacziarg and Welch (2003).

**B. Income Inequality (Gini index)**



Source: Dollar and Kraay (2003, JEG) and De Ferranti, Perry, Ferreira and Walton (2003), "Inequality in Latin America: Breaking with History?". Time at which trade liberalization occurs is from Wacziarg and Welch (2003).

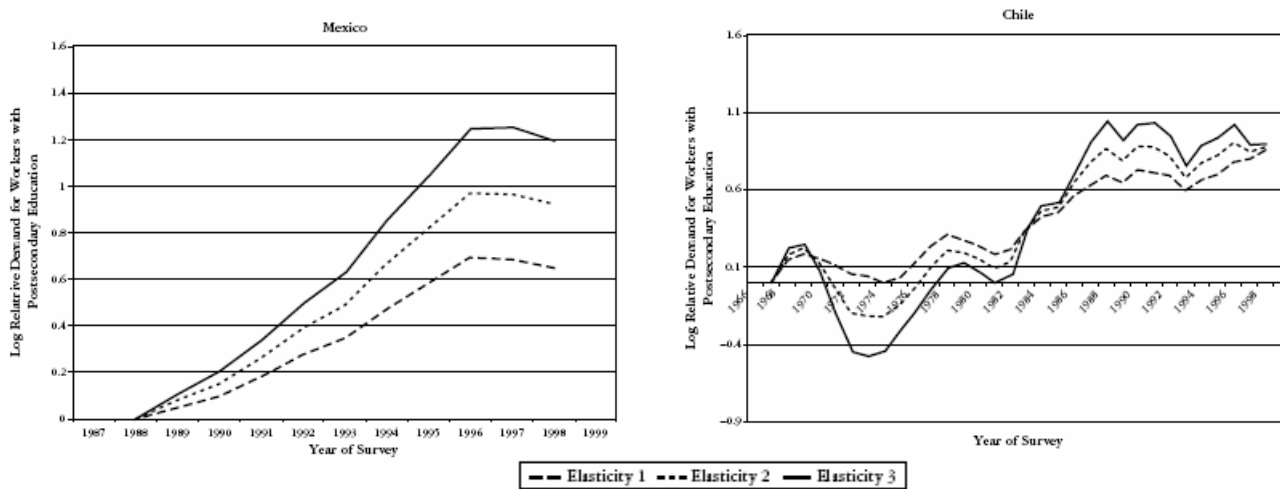
**C. Skill premium**



Source: Manacorda, Sanchez-Paramo and Schady (2005). "Changes in Returns to Education in Latin America: The Role of Demand and Supply of Skills", Changes in skill premiums for workers with tertiary vs secondary. Time at which trade liberalization occurs is from Wacziarg and Welch (2003).

The increase in skill premiums for workers with tertiary education is explained by the fact that there were significant increases in relative demand for these skilled workers in most countries just after trade liberalization, which were not met by increases in supply. There was also increased relative demand for workers with secondary education *vis-à-vis* those with just primary education, though relative supply shifts led to reduced skill premiums in this case in several countries. See estimates of relative demand for skills in Chile and Mexico in Figure 2.3 (similar evidence is provided in *Manacorda, Sanchez-Paramo and Schady, 2005* for Argentina, Bolivia, Brazil and Colombia).

**Figure 2.3**  
**Relative demand for skilled workers (tertiary vs. secondary education)**



Source: Sánchez-Páramo and Schady (2002), based on the labor force surveys. Note: Demand series are three-year moving averages.

Nevertheless, the observed increases in skill premiums wage and income inequality may not have been *caused* by trade opening, as many other things were going on at the same time. Indeed, many countries engaged simultaneously in capital account opening, financial sector liberalization, privatization of public enterprises, and domestic markets deregulation. It is extremely difficult to identify and separate the effects of all these policy reforms and the few studies that have attempted to do it come to different conclusions.

*Behrman, Birdsall and Szekely, IADB (2000)* examined the joint and separate effects of reforms on wage differentials among workers with primary, secondary, and tertiary education over time, using comparable wage data and Lora's<sup>3</sup> index of reforms, as extended and modified by Morley<sup>4</sup>. They found that the package of reforms had a strong but temporary effect on wage differentials (a negative effect on wages of workers with primary education, slightly positive for workers with secondary education, and strongly positive for workers with tertiary education), but that this was due to the effects of

<sup>3</sup> Lora (1997). Trade reform is measured as the average of the average level of tariffs and the average dispersion of tariffs, although he obtains the same result with a measure of trade openness.

<sup>4</sup> Morley, ECLA (2000)

financial market reform, capital account opening, and tax reform, while trade reform results were not statistically significant and the effect of privatization went in the opposite direction. The stronger effects were due to capital account opening and financial liberalization, though they faded away rapidly over time. They hypothesized this was probably due to complementarities between capital and skills, and thus concluded that “technological progress, rather than trade flows, appears to be the channel through which reforms are affecting inequality”. *Morley, ECLA (2000)*, examined the joint and separate effects of reforms on income distribution using household survey data and the same reform indexes, and he found strikingly different results: the overall effect was statistically not significant, while trade and tax reform appeared to increase income inequality and capital account opening to reduce. The effects of financial liberalization and privatization were not statistically significant. The same happens with studies using global samples with respect to the effect of trade openness on inequality. *Dollar and Kraay*, found no significant effects of trade openness on inequality. *Barro, 2000* found a positive association between the two variables, surprisingly stronger for poorer countries<sup>5</sup> *Lopez, World Bank, 2003*, found similar results to Barro’s. In most of these studies a Latin American dummy remains significant, so a large list of determinants and controls do not fully explain away the region’s “excess” inequality.

Differences in results in these studies may be due to differences in samples, indexes of inequality and reform or trade openness, control variables and estimation procedures. However, it is noticeable that none of them found a statistically negative effect of trade opening or openness on wage or household income inequality (that is, of reducing inequality), as was expected. The same happens in most of available country studies using micro-econometrics. For example, *Nicita (2005)* found that trade liberalization increased income inequality in Mexico, *Feliciano (2001)* found a similar effect on wage inequality also in Mexico, and *Galiani and Porto (2005)* found a similar result for Argentina. In contrast, *Porto (2006)* estimated a decrease in overall inequality in Argentina due to Mercosur, a trade liberalization experiment within developing countries.

Further, the notoriety of trade opening as the back bone of the pro market reform program in Latin America has led to the generalized belief that it was indeed the main culprit behind the observed increases in wage and income inequality. We will examine below potential explanations for such results. In section 2.A we take a better look at relative factor endowments in LAC and discuss what one should expect from a more informed analysis. In section 2.B we look at the role played by skilled-bias technological change and entry and exit of firms subject to more competition from abroad. And, in section 2.C we look at the importance of initial conditions (such as the initial tariff structure) and other contemporary events e.g., (exchange rate policies). Finally, section 2.D explores other potential channels through which trade liberalization can affect income inequality.

## **2. A. Is there a puzzle? A better look at factor endowments**

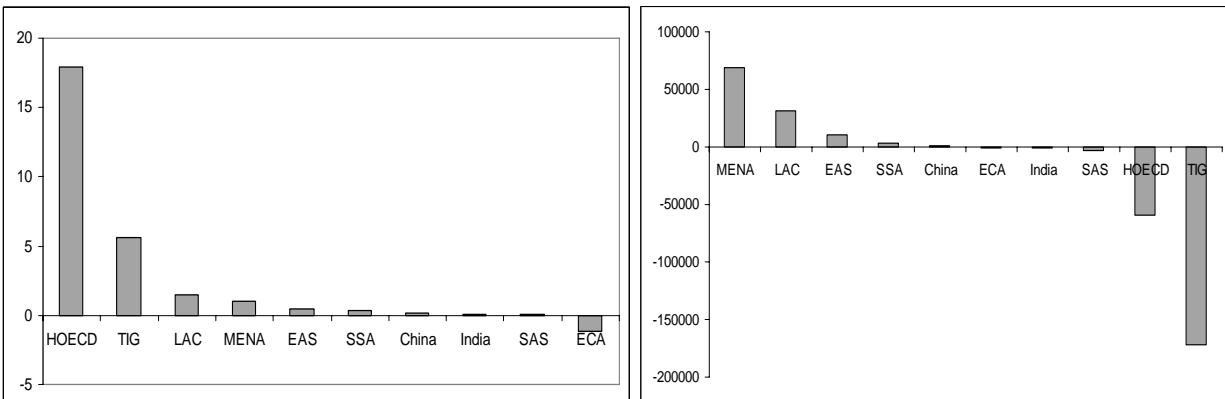
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<sup>5</sup> Interacting trade openness with GDP per capita

The answer to the apparent puzzle may actually be related to LAC's specific relative factor abundance and their complementarities.<sup>6</sup> LAC is rich in natural resources and, by the time of trade liberalization (late eighties and early nineties) other developing countries with large pools of unskilled labor endowments, lower capital per unskilled worker ratios and hence lower wages, such as China and India, were already emerging in the world trade scene (see Figure 2.5). The situation of the East Asian Tigers in the 1960's and 70's was different: it was a region poor in natural resources and China, India and Vietnam were by then not integrated into the world economy (nor did most of LAC to a large extent), so the Tigers were at the time among the least capital intensive abundant economies integrating in the world economy.

Figure 2.5 shows indexes of natural resource endowments per worker and capital per unskilled worker for several regions, the East Asian Tigers, China and India, which indeed permit characterizing LAC as a region rich in natural resources and with an intermediate abundance of capital or unskilled labor at the time of trade liberalization (around 1990). Country indexes, though, show substantial heterogeneity within LAC, that we should not lose sight of and, also, capital stock measures are notoriously unreliable so these indexes should be used with caution.

**Figure 2.4**  
**Factor endowments by region**  
**Capital to unskilled labor index (1990)**                      **Index of natural resources comparative advantage by region (1990)**



Source: Barro & Lee dataset  
 Note: A positive number indicates that the region relative to the world is well endowed in skilled labor. It is calculated as the ratio of the region to the world relative skilled labor abundance minus 1.

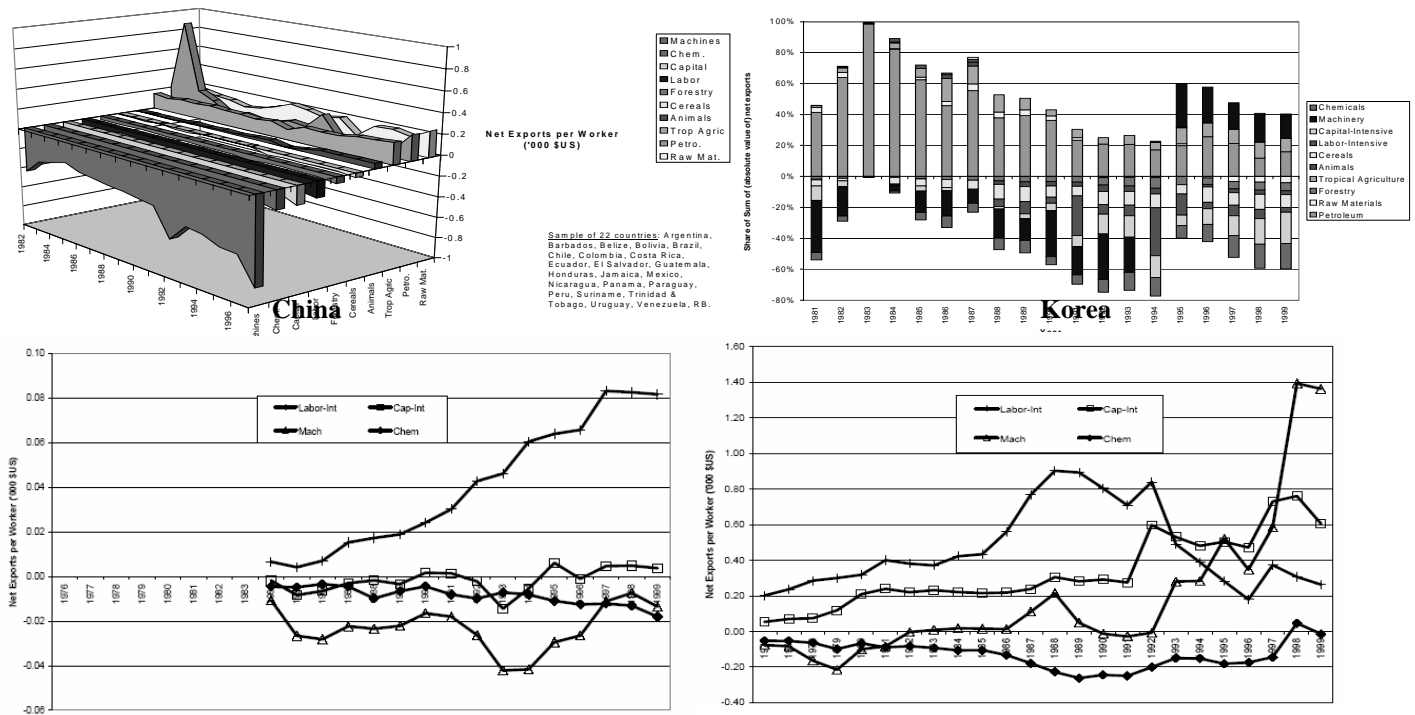
Source: WDI, 2000  
 Note: The natural resource index is calculated as the trade balance (exports minus imports) in ores, mineral, fuel, agricultural raw materials and food divided by the labor force. Units are US \$ per worker

Figure 2.6 confirms that revealed comparative advantage (as measured by net exports per worker by Leamer's commodity categories), before and after trade liberalization, conforms to this characterization. Overall, LAC specializes in natural resource intensive

<sup>6</sup> Wood (1995, 1999) was the first to observe this as a potential explanation. It is surprising, though, that apart from Leamer and Davis, most of the already vast literature (see the survey of surveys by Koujianou and Pavcnik) attempting to explain this apparent puzzle ignores this basic fact and concentrate almost exclusively on other issues that certainly contributed to explain the puzzle, but were probably less fundamental.

activities and not in unskilled-labor intensive activities, and some countries like Mexico have begun to show comparative advantage in capital intensive activities since the mid nineties (the same is the case for Costa Rica, see *de Ferranti, Perry, Lederman and Maloney, 2003*).<sup>7</sup> In contrast, China specializes in unskilled labor intensive activities, while Korea began specializing in unskilled labor intensive activities but shifted overtime to capital intensive activities as its capital/unskilled ratio grew and, more importantly, more unskilled labor abundant countries liberalized their trade and emerged as important competitors in unskilled labor intensive activities.

**Figure 2.5**  
**Indexes of Revealed Comparative Advantage (exports per worker by type of activity)**  
**LAC México**



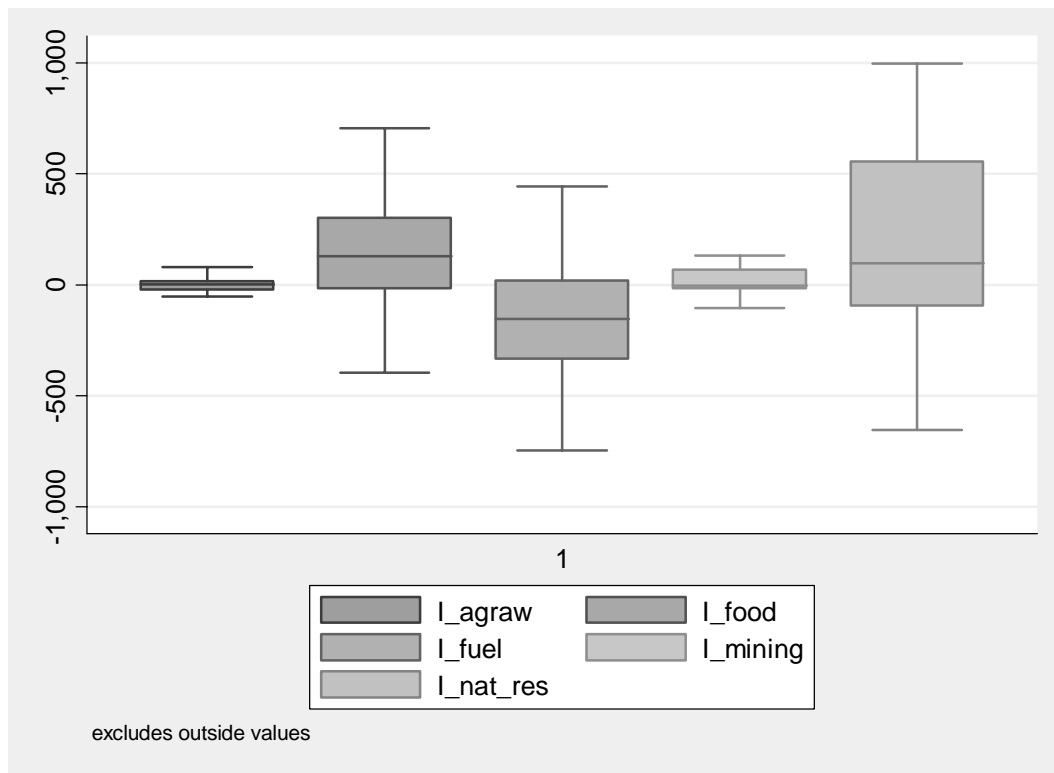
Source: De Ferranti, Perry, Lederman and Maloney, 2002. “From the natural resources to the knowledge economy”

Mexico is only one example to illustrate that LAC is not a homogenous continent when it comes to factor endowments and revealed comparative advantage. There is significant heterogeneity within the region, which can also help explain differences in outcomes across countries. For example in the year 2000 Haiti had a capital to unskilled worker ratio of \$150 whereas Uruguay’s ratio is close to \$80 thousand. Similarly, the unskilled to skilled ratio goes from 0.12 in Haiti to 1.6 in Barbados. It is 1.03 in Uruguay, which is the third country in the ranking after Barbados and Trinidad and Tobago. Thus, given that Uruguay and Haiti are at opposite ends of the scale in terms of skilled-labor and capital abundance in the region, it may not be surprising that after trade reform one observes a

<sup>7</sup> See discussion below in 2A on outsourcing

very different outcome in terms of wage and income inequality, with Uruguay experiencing an increase in wage inequality (and a more modest increase in income inequality), as shown in Figure 2.2. Similarly, Jamaica has net exports of natural resources per worker of -\$650,<sup>8</sup> whereas Venezuela has net exports of natural resources per worker closed to \$2600. The skilled to unskilled ratio is 0.6 in Venezuela and 1 in Jamaica. The consequences of (somehow similar) trade reforms are likely to be very different given the differences in endowments. Figure 2.7 captures the heterogeneity in revealed comparative advantage in different types of natural resources within LAC. It shows that the heterogeneity is quite significant and tends to be driven by big differences in comparative advantage in fuel and food.

**Figure 2.7**  
**Variation in natural resource (revealed) comparative advantage within LAC**



Note: Each box shows the 25<sup>th</sup> to 75<sup>th</sup> percentile range of the revealed comparative advantage in each type of natural resource, i.e., 50 percent of the observations in the middle are in the box. The upper limit of the vertical line on top of the box shows the adjacent upper value and the lower limit of the vertical line below the box shows the adjacent lower value. The horizontal line inside the box is the median.

### 2.A.1 Implications of LAC intermediate unskilled labor abundance

It has been shown that, even in a world with two factors of production, if one assumes that factor endowment differences in the world are too large to allow for full global factor

<sup>8</sup> Our index of natural resources is based on trade in goods and ignores tourism exports.

price equalization through free trade (as is evidently the case), what matters is not factor abundance compared to the global economy, but relative to the *cone* (a subset of countries with similar relative endowments) within which a given country competes on the same products (Davis, 1996 and Leamer, 1988). In such a two factor many countries model, countries that have high unskilled labor abundance as compared to the global economy, but high capital/skill endowments within its *cone* will suffer increased inequality from trade liberalization.<sup>9</sup> If LAC was indeed less unskilled abundant than other competing developing areas when it liberalized to trade, most notably China and India, as Figures 2.5 and 2.6 indicate, such a simple model would indeed predict a rise in demand and returns for capital and for more skilled workers, assuming capital/skill complementarities and that countries are in the same diversification cone (see evidence below on this).

Robertson (2004) provides some indirect evidence. He examines the relationship between relative goods prices and relative wages on Mexico at two different moments: after its entrance to the GATT in 1986, and after its entrance to NAFTA in 1994. For the first, the evidence shows that the relative price of skill-intensive goods and the relative wage of skilled workers rose. For the second, the results are the opposite but they are consistent with Mexico's integration with United States and Canada –skill-abundant countries— rather than with the whole world. This is perfectly consistent with the prima facie evidence shown for Mexico in Figure 1 (Panel A), where there is an increase in wage inequality starting at the time of entrance to the GATT which coincides with the start of trade reforms according to Wacziarg and Welch (2003). Similarly wage inequality starts declining eight years after the reform –around 1994— which coincides with Mexico's entrance into Nafta.

Incorporation of new products/processes (or rapid growth of some specific product/processes) *in the margin* also played a significant role in some cases of trade opening in LAC. Feenstra and Hanson (1996) found evidence of such effects in Mexico through outsourcing and showed that these activities were below the average skill intensity in developed countries but above the average skill intensity in receiving developing countries. This is behind Mexico's differential performance in Figure 2.6. There are no studies of this sort available, unfortunately, for other LAC countries, but similar effects are also likely to be important for Central American and Caribbean countries, specially noticeable in the case of Costa Rica, that enjoy similar locational advantages and special trade arrangements with the US as Mexico and in which there has been indeed significant development of outsourcing (“maquila” exports through Export Processing Zones)<sup>10</sup>. Davis and Mishra show that outsourcing effects of this type are only part of a more general case in a model of continuum goods in which trade liberalization prompts the development of new products/exports at the expense of a

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<sup>9</sup> Results are even more heterogeneous within developing countries in a three factor world, with some experiencing improved income distribution and some worsened income distribution. Leamer and Levinson (1995) point out that there is currently no empirical identification of international production cones and, hence, there is no way to anticipate distributional consequences of trade liberalization in Davis framework.

<sup>10</sup> Monge (2001) for Costa Rica, El Salvador, Honduras and Dominican Republic) Maria Fernanda: quote in FNRKereferences

country (or countries) in a neighboring *cone* (what they call “*boundary*” goods, that are at the same time less skill intensive in one country and more skill intensive in the other).<sup>11</sup>

### 2.A.2. Implications of LAC’s abundance of natural resources

Trade opening in natural resource rich economies should be expected to lead to increased rents to landowners (and land is heavily concentrated in most of LAC), oil and mine owners (normally the State, so distributional effects would depend on what they do with the increased rents) and holders of exploitation rights (which are mostly large capital intensive companies). Effects on income distribution should also depend on the degree of complementarities with capital and skills, which is expected to be high in the case of mining, forestry, fisheries and agricultural raw materials.<sup>12</sup> Table 2.1 shows that net exports of mining and agricultural raw materials tend to be positively correlated with capital, while net exports of food are correlated with unskilled labor in LAC<sup>13</sup>. Further, capital and skilled labor also seem to be correlated in LAC.

**Table 2.1**  
**Partial correlations between capital, skilled labor and natural resources**

Depended Variable: (capital/unskilled labor)		
	Coefficient	t-stadistic
skilled/unskilled	1.4916	2.38****
Food	-0.0003	-2.84***
Mining	0.0003	1.85*
Fuel	0.0000	-0.28
Agricultural ram materials	0.0021	4.04**
Number of observations	199	
R-Squared	0.97	

Source: Authors' calculations

Note: The regression includes controls for country and year fixed effects

Models considering three factors of production grow enormously in complexity and predictions become more difficult or impossible.<sup>14</sup> *Leamer et al, (1999)* explain Latin American inequality, as a natural consequence of a development path determined by its rich natural resources endowments, with the use of a simple three-country, three-goods,

<sup>11</sup> *Xu (2003)* builds a model in which the expansion of exportables previously non traded shift relative factor demand and prices in favor of skilled labor.

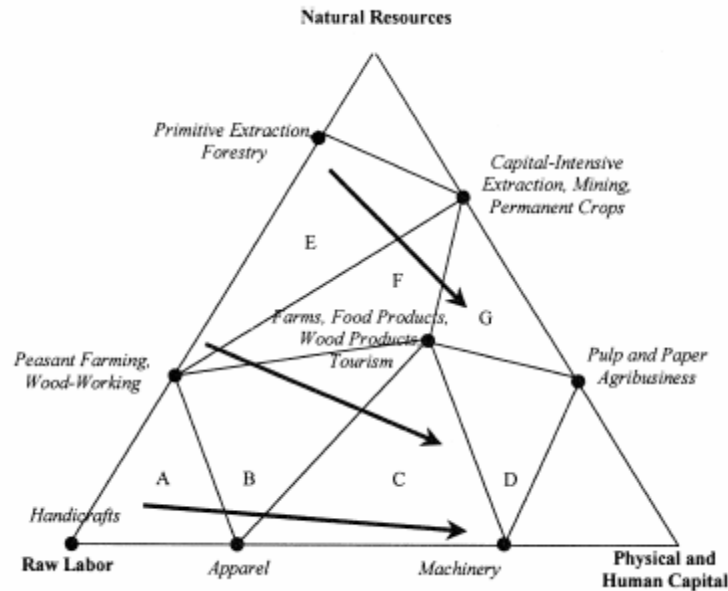
<sup>12</sup> As discussed above, there is considerable heterogeneity across different natural endowments by countries

<sup>13</sup> Complementarities of oil intensity with capital and skill were not significant, though this may be due to underestimation of capital investments in the sector (specially in exploration).

<sup>14</sup> *Ethier (1984)* shows that in a world with more goods than factors it is impossible to predict production levels (once zero profits and factor price equalization are assumed). The reason is that the solution to this problem involves  $f$  equations and  $g$  unknowns, where  $f$  is the number of factors and  $g$  is the number of goods, and  $f < g$ . However, in this world with higher dimensions (to quote *Ethier*) it can be shown that on average there will be price increases for those factors which are intensively used in the production of goods which see their relative price increase and their production expand.

three factors framework (in which skills and capital are complementary and thus aggregated into a single factor). The model is exemplified in Figure 2.8. Natural resource rich countries without a large pool of unskilled labor (e.g., Venezuela) would follow a development path from primitive extraction of natural resources to capital intensive extraction and to capital intensive manufacture (path E, F, G in the diagram). Such countries may never compete in the same products (eg, apparel) with countries with abundant unskilled labor and poor in natural resources (that would follow the A, B, C, D path in the diagram) and would maintain a higher capital intensity and skill premium (higher inequality) all along their development path. Countries with a mix of endowments (both natural resources and unskilled labor abundant, such as Brazil and Mexico), would follow an intermediate development path (exemplified in the diagram by the points from “peasant farming/wood-working” to “food products, wood products, tourism” to “pulp and agri-business”), with intermediate capital intensity, skill premiums and inequality.

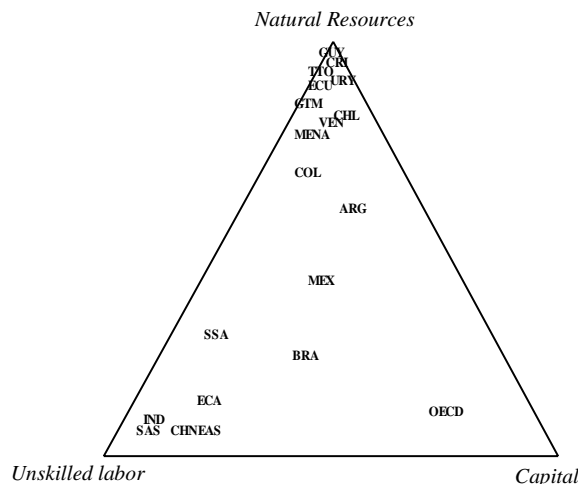
**Figure 2.8**  
Natural resource development paths for LAC



Source : Leamer and Schott (1999)

Figure 2.9 shows the Leamer triangle with the endowments of different regions in the world and some LAC countries in the year 2000. It shows that most LAC countries are still likely to develop along path EFG with the exception perhaps of Brazil and Mexico which may experience some competition from China and India (in the lower left corner) along their development path.

**Figure 2.9**  
Leamer triangle for LAC countries and other regions, 2000



Source: *Unskilled (raw) labor* is obtained from the Barro and Lee dataset assuming that unskilled or raw labor is given by the labor force with up to secondary education completed. *Capital* is obtained using the perpetuity inventory method from WDI data (qualitative similar results are obtained using skilled labor calculated using the Barro and Lee dataset). *Natural Resources* is proxied by net exports of products intensive in natural resources. It is transformed into  $R^+$  by taking the six root of the exponential of net exports. All endowments are then normalized to be between 0 and 1.

Note: The endowment triangle is constructed by multiplying for each country the normalized  $3 \times 1$  vector of endowments (so that all endowments are between 0 and 1) by a  $2 \times 3$  matrix with rows equal to  $(0, 0.5, 1)$  and  $(0, 0.87, 0)$  in order to transform the three dimensional vector into a dimensional simplex. For more details see Peter Schott (1998), *How to plot an endowment triangle*, mimeo UCLA.

The Leamer model assumes that capital and natural resources are concentrated, and that labor is uniformly distributed –everybody is unskilled in the raw labor vertex, everybody is skilled in the capital vertex-. It predicts that natural resource abundant countries would have higher income inequality than labor abundant countries, and capital abundant countries would have lower inequality than the latter (wages would be higher, capital returns lower). They find that such predictions can be validated empirically (with cropland/worker as a proxy for natural resource abundance), though their results do not explain away all “excess” inequality in LAC (the coefficient on a LAC dummy is positive and statistically significant). They also find statistically significant positive partial correlations of Ginis with **net export shares** (as an indicator of revealed comparative advantage) in tropical agriculture (specially permanent tropical agriculture) and raw materials, and significantly negative with net export shares in machinery, chemicals and capital-intensive manufacturing<sup>15</sup>.

Leamer’s diagram can also be used to analyze the effects of different natural resource endowments, depending on their complementarities with capital and skills. The development path of countries rich in those 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 (unless Governments redistribute income and increase the supply of skills using oil/mining

<sup>15</sup> Leamer et al (1999). Such results are relatively robust to controls by income per capita and economic distance.

rents). The development path of countries rich in natural resources complementary with unskilled labor (foodstuffs) would follow an intermediate path, with intermediate skill premiums and inequality.

The diagram can also be used to illustrate a key point for Latin American trade opening. As trade protection in LAC was specially high in unskilled intensive sectors (see below) countries kept a product mix that balanced some natural resource intensive exports (that were nonetheless taxed) with unskilled intensive protected production for the domestic sector (and some exports, specially for developed markets in which they enjoyed trade preferences). Trade opening would then mean shifting further from the Raw Labor vertex towards the Natural Resource Vertex, reducing the demand for unskilled labor, and, when natural resources are complementary with capital and skills, skill premiums and capital returns would increase leading to higher inequality.

We performed for this paper an additional exercise to test the impact of natural resource abundance on the effects of trade liberalization on inequality. We ran Lopez’s (2004) model including explanatory variables that interact trade openness with indexes of factor abundance.<sup>16</sup> Results are shown in Table 2.2.

**Table 2.2**  
**Differential effects of trade openness on inequality according to factor endowments.**

Variable	(1)	(2)	(3)	(4)	(5)
Opennes to trade	2.37	1.69	1.67	1.79	2.02
<i>t-stat</i>	3.04 *	1.93 **	2.00 *	1.69	2.57 *
Opennes to trade x food index		-0.31			
<i>t-stat</i>		-2.54 *			
Opennes to trade x mining index			0.50		
<i>t-stat</i>			1.97 *		
Opennes to trade x fuel index				0.03	
<i>t-stat</i>				1.00	
Opennes to trade x raw materials index					-0.57
<i>t-stat</i>					-2.99 *
Sargan p-val	0.77	0.75	0.75	0.75	0.73
SOC p-val	0.42	0.38	0.39	0.4	0.42

Note. The table reports the results of regressing the changes in the gini coefficient on the following variables: secondary education, financial development, government consumption, infrastructure, governance, inflation, banking crisis, TOT, output volatility and exchange rate. Estimation method is GMM as in Lopez (2004). Observations are 5 years average.

\* Significant at the 5 percent. \*\* Significant at the 10 percent.

In all cases trade openness continues to increase inequality.<sup>17</sup> More interestingly, the magnitude of the effect rises with net exports of minerals and agricultural raw materials (the interaction of trade openness with abundance in mining and raw materials resources increase inequality beyond the general effect of trade openness; the same happens with oil abundance, though in this case results are not statistically significant) and lower for countries that specialize in foodstuffs. We get a similar result for higher skill abundance

<sup>16</sup> We thank Humberto Lopez for his help with these exercises

<sup>17</sup> Though Dollar and Kray find no effect of trade opening on inequality, Table 6 indicates that most of LAC (and Africa) globalizers did increase or maintained inequality (except Jamaica and Venezuela).

(as measured by skill/unskilled labor ratios) but , contrary to Leamer, we find no relation whatsoever with higher capital abundance (as measured by capital to unskilled labor ratios).

## 2.B. Is there a Puzzle? Schumpeter’s destructive creation and Skill Biased Technological Change

Most studies do not observe large labor reallocations across industries after trade liberalization in LAC (*Harrison and Hansen (1999)* and *Revenga (1997)* for Mexico, *De Ferranti, Perry, Lederman and Maloney (2003)* for several countries in LAC), in sharp contrast to findings for the US that indicate higher employment than wage sensitivity to trade shocks.<sup>18</sup> At the same time, several studies have found that the share of skilled workers has increased substantially within most industries in the last two decades and that intra industry effects dominate inter industry effects in explaining the increased demand for skilled workers in Latin America after trade liberalization <sup>19</sup>. See, for example, Table 2.3, taken from De Ferranti, Perry, Gill, Guasch, Maloney and Schady (2003), based on *Sanchez-Paramo and Schady (2003)*. See also and *Atanasio, Goldberg and Pavcnik (2004)* for Colombia.

**Table 2.3**  
Changes in the wage bill for tertiary workers and secondary workers

### Tertiary

	Period	Change in $S_t$ (annualized – % points)	Change due to Within- Industry Changes (annualized – % points)	Change due to Between- Industry Changes (annualized – % points)
Argentina	1986-89 and 1997-99	1.8	1.3	0.5
Bolivia	1989-91 and 1997-99	1.8	2.2	-0.4
Brazil	1982-83 and 1987-89	-0.1	-0.1	0.0
	1987-89 and 1997-99	-0.2	-0.2	0.0
Chile	1977-79 and 1987-89	1.2	1.1	0.1
	1987-89 and 1997-99	0.1	0.2	-0.1
Colombia	1982-83 and 1988-89	-0.1	0.0	-0.1
	1988-89 and 1998-99	1.1	0.9	0.2
Mexico	1987-89 and 1997-99	2.1	2.0	0.1

### Secondary

	Period	Change in $S_s$ (annualized – % points)	Change due to Within- Industry Changes (annualized – % points)	Change due to Between- Industry Changes (annualized – % points)
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<sup>18</sup> For evidence of the lack of labor reallocation in several developing countries see: *Revenga (1997)*, *Hanson and Harrison (1999)*, and *Feliciano (2001)* for Mexico; by *Currie and Harrison (1997)* for Morocco; and by *Wacziarg and Wallack (2004)* in a cross-country study of trade liberalization.

<sup>19</sup> Within-industry increases in the share of skilled workers have been reported for Argentina, Brazil, Mexico, Chile, and Colombia (*Robbins (1996)*, *Sanchez-Paramo and Schady (2003)*, *Atanasio, Goldberg, Pavcnik (2004)*).

Argentina	1986-89 and 1997-99	1.0	0.9	0.1
Bolivia	1989-91 and 1997-99	3.7	3.6	0.1
Brazil	1982-83 and 1987-89	1.6	1.5	0.1
	1987-89 and 1997-99	0.6	0.9	-0.3
Chile	1977-79 and 1987-89	1.0	1.1	-0.1
	1987-89 and 1997-99	0.6	0.6	0.0
Colombia	1982-83 and 1988-89	1.3	1.4	-0.1
	1988-89 and 1998-99	1.4	1.3	0.0
Mexico	1987-89 and 1997-99	0.6	0.7	-0.1

Source: Sanchez-Paramo and Schady (2002).

Note: The wage bill for tertiary workers,  $S_t$ , is the wage bill of tertiary workers as a fraction of the wage bill for secondary and tertiary workers, while the wage bill of secondary workers,  $S_s$ , is the wage bill for secondary workers as a fraction of the wage bill for primary and secondary workers.

Changes in product mix within sectors, shifting production towards those that are relatively more skilled intensive, such as those found by *Feenstra and Hanson (1996?)* for Mexico and discussed in 2.A above, may help explain the substantial intra industry reallocation that led to significant skill deepening in most industries. Such a fact, however, may also be explained by two dynamic effects of trade opening.

First, an acceleration of Schumpeter's destructive creation, as a consequence of increased competition, would lead to a significant reallocation of labor towards more productive (and more skill intensive) firms within industries subject to trade liberalization (see *Melitz (2003)* for a theoretical justification) There is indeed evidence that trade (or exchange rate) shocks have caused significant productivity increases and reallocation of labor across firms within the same sector, for example after the exchange rate devaluation of 1995 in Mexico –see *Verhoogen (2004)*.

Second, an acceleration of the transmission of Skill Biased Technical Change (SBTC), that has been identified by several studies as a major force behind increases in inequality in OECD countries in the last decades, might also help explain increased skill intensities in most industries after trade liberalization.. Suggestive evidence in support for this hypothesis in LAC is presented in *Closing the Gap in Education and Technology, de Ferranti, Perry et al (2003)* based on *Schady and Sanchez Paramo (2003)*. They find a high correlation among sectors in which skill upgrading to tertiary education took place in different LAC countries after trade liberalization, suggesting that the increase in skill intensities in the nineties had a common external origin (SBTC could have accelerated through trade opening).<sup>20</sup> They also find that there is more skill upgrading in countries and industries with higher import penetration, especially of imports intensive in R&D, and FDI stocks.<sup>21</sup> The sharp rise of capital equipment imports after trade opening (Figure 2.10) would suggest one potential channel for a faster transmission of SBTC.<sup>22</sup> In support of this view *Harrison and Hanson (1999)* found that those firms in Mexico that, within each industry, import more machinery and materials are more likely to employ a higher

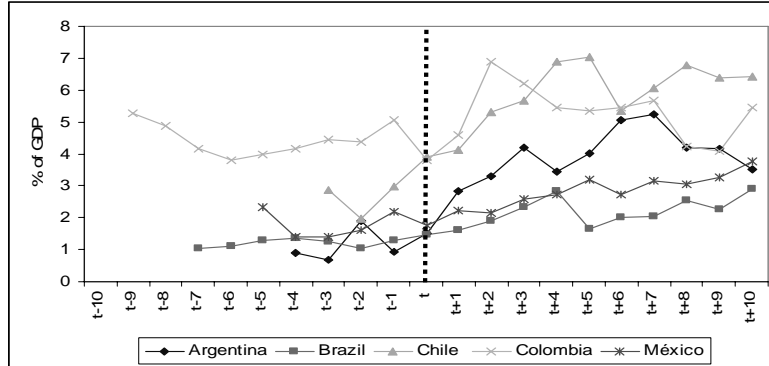
<sup>20</sup> De Ferranti, Perry, et. al. (2003). "Closing the Gap in Education and Technology, Table 3.2.

<sup>21</sup> Op. Cit. Table 3.4

<sup>22</sup> See Acemoglu (2003)

share of white-collar workers. Similar results relate skill upgrading with the degree of exposure of firms to technology from abroad in Chile -Pavcnik, (2002).<sup>23</sup>

**Figure 2.10**  
LAC capital equipment imports/GDP before and after trade reforms



Source : WDI

## 2. C. Is there a puzzle? Initial conditions and contemporary events

Initial conditions matter. Latin America used to protect more unskilled-labor intensive sectors and trade opening reduced protection more sharply in these sectors, further reducing the demand for unskilled labor. Koujianou and Pavcnik (2004) quote studies for Brazil, Colombia and Mexico -Feliciano (2001), Harrison and Hansen (1999), - (and Morocco)<sup>24</sup> that found indeed such a pattern of protection pre-reform. See Figure 2.11.

As Davis and Mishra (2004) point out, this fact would make no sense in the standard HO model, as such goods would be exports, not imports, but it does in a more complex model in which countries which are intermediate in unskilled labor abundance import different kinds of goods from countries with both higher and lower capital (skill) intensity, as discussed in 2. A. above. Also, Import Substitution Industrialization in LAC was based on a tariff structure that gave positive effective protection to most manufacturing sectors at the expense of natural resource based activities (which had negative effective protection). Thus trade liberalization should have been expected to significantly increase the rents of holders of property rights on natural resources.

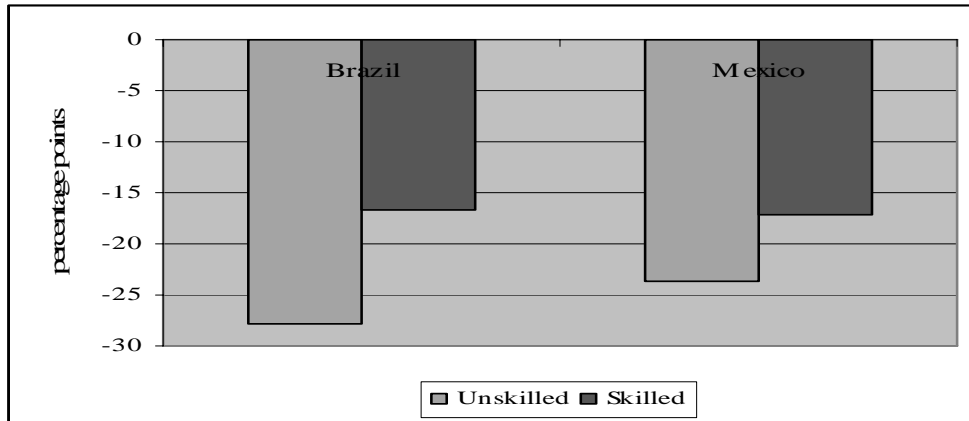
As industries with higher tariff cuts were more unskilled intensive, lack of labor mobility, that is alleged to be behind the observed lack of labor reallocation between industries, could lead to changes in industry wage premiums that would translate in turn into

<sup>23</sup> Verdier and Thoenig (2003) develop a theoretical model where SBTC is not exogenously given by the fact that more capital intensive technologies are available, but due to the fact that firms exposed to more competition endogenously engage in more skilled biased technological change that require more skilled-intensive activities to try to avoid imitation by competitors (because less codified technologies require more learning efforts to be handled)

<sup>24</sup> Colombia (Attanasio, Goldberg, Pavcnik (2004)), Mexico (Hanson and Harrison (1999), Robertson (2000, 2004 for pre-NAFTA period), Morocco (Currie and Harrison (1997)), and Brazil (Pavcnik, Blom, Goldberg and Schady (2004)).

increased relative skill premiums. Some studies for Colombia (Attanasio, Goldberg and Pavnick, 2004) and Mexico (Feliciano, 2001) find evidence of such a relation, though with small quantitative effects, while others do not (Pavnick, Blom, Goldberg and Schady, 2004).

**Figure 2.11**  
**Changes in (production weighted) average tariffs in skilled and unskilled intensive sectors**



Source : For Brazil is UNCTAD’s Trains data and for Mexico Hanson and Harrison (1999): “Trade and wage inequality in Mexico”. In the case of Brazil we are comparing tariffs changes between 1989 and 2004. In the case of Mexico we are comparing tariff changes between 1984 and 1990. The following ISIC rev. 2 2-digit sectors are considered as unskilled intensive: ISIC 31 (Food, Beverages and Tobacco), ISIC 32 (Textile, wearing apparel and leather industries), ISIC 33 (Wood and wood products) and ISIC 39 (Other manufacturing industries).

In addition, trade opening in LAC was generally accompanied by a period of appreciation and overvaluation of the currency, which cannot be attributed to trade liberalization. On the contrary, we would have expected from theory to observe a compensatory devaluation of the exchange rate. Appreciation and overvaluation of the exchange rate was rather caused by the sharp rise in capital flows that took place mostly as a consequence of capital account opening, at a time in which there was a global increase of capital flows to all emerging markets, as well as to monetary and exchange rate policies in some countries (notably in Argentina and Brazil).

This unexpected phenomenon led to a period of increase in growth and relative prices of the non-tradable sector, as well as of cheap capital imports. The latter, in addition to the effect of reductions in tariffs of capital goods imports, in turn caused biased capital deepening and additional increased demand for skills. The increased share of the non tradable sector also led to an increase in informality, as discussed in Section 3.

On the other hand, currency overvaluation delayed some of the expected increased rents to natural resource owners and mitigated the increase in demand for skills, as non-tradable sectors are usually less skilled intensive. Thus, currency overvaluation had both temporary positive and negative effects on income distribution, though probably the latter were larger in most countries. These effects were obviously transitory: they ended abruptly with the currency crises and devaluations prompted by the generalized capital flows reversals after the Russian crisis of 1998.

## 2.D. Further Effects of Trade Liberalization on Income Distribution

Pervasive labor market rigidities in LAC mitigated or delayed the reallocation of labor in response to the price changes induced by trade liberalization and, at the same time, might have contributed to temporary increases in unemployment in some countries, and to observed increases in informality, adding to inequality effects. There might have been as well effects of trade liberalization on increased labor participation, especially of female workers that normally had lower skill levels, which might have accentuated wage inequality trade effects, but reduced overall household income inequality.<sup>25</sup>

There has also been a debate around the effects of trade opening on macroeconomic and household incomes volatility. Evidence on this is mixed. Macroeconomic volatility was actually reduced in the nineties with respect to the two previous decades –*Securing Our Future in a Global Economy, 2002-*, though this might have been mostly the effect of better macroeconomic policies. To the extent that the poor are less protected against macro and idiosyncratic labor market risks, any increase in such risks would lead to a more unequal distribution of welfare and of income distribution in the short run (it might also have some long term effects on income distribution through lower human capital accumulation of the poor).<sup>26</sup> Moreover, as trade liberalization impose competitive pressure, and requires quick adaptation to changing market conditions it may lead to a move towards informality where labor and business regulations are rigid, leading to unprotected and perhaps lower paid workers.

Trade liberalization affects household's income and welfare through changes in factor returns and employment, but also through changes in prices of the goods they consume. *Goni, Lopez and Serven (2005)* found that price changes in the nineties in LAC strongly benefited the poor and hurt the more well to do. Figure 2.12 show the case of Brazil, but similar results were found for other countries. This is the other side of the coin of the reduction of former protection that affected mostly unskilled labor intensive activities, which produced mostly basic consumption goods. Usual income distribution figures do not correct for such differences in price deflators by deciles or households and thus present a bias picture. Thus actual inequality increases in LAC in the nineties may not be as large as indicated by commonly used figures (that use overall IPC as a deflator of household income data) and the effects of trade liberalization on increased inequality may have been exaggerated

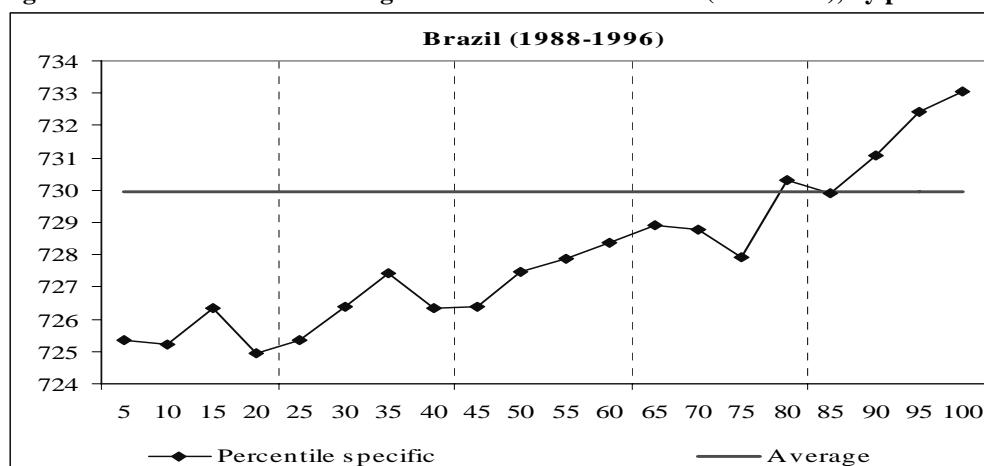
A more comprehensive discussion of the impact of trade liberalization on unemployment, income volatility, informality and the cost of consumption bundles for different income groups is left for the Section 3 which describes the impact of trade liberalization on the poor.

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<sup>25</sup> Op. Cit., Figures 5.5 and 5.6

<sup>26</sup> See evidence on this in *Perry, Lopez, Maloney, Arias and Serven, (2005), Chapter 2*

**Figure 2.12 Individual and average annual inflation in Brazil (1988/1996), by percentiles**



Source : Goñi, López and Servén (2005). “Getting real about inequality Evidence from Brazil, Colombia, Mexico and Peru”

Finally, trade liberalization may also affect household’s incomes and welfare through changes in Government taxes and expenditures in response to the effects of trade liberalization on Government revenues. Actually, most countries in LAC compensated tariff revenue reductions by VAT increases with no obvious effect on inequality. On the other hand, the medium term effect on inequality of increased public expenditures in countries in which taxes and royalties from oil and mineral extraction are important, was probably quite heterogenous, ranging from progressive in Chile (where public expenditures have been progressively focused in favor of the poor) to regressive in oil producing countries (in which high subsidies to energy, tertiary education and pensions tend to make overall public expenditures regressive )<sup>27</sup>. Given that the larger effects of trade liberalization on increased wage inequality operated through increases in skill premiums, Government responses in increasing education coverage through both investments in education supply and conditional cash transfers to increase effective demand by the poor, are key for determining overall long term effects. See Section 4.

### 3. Trade reforms and poverty in Latin America

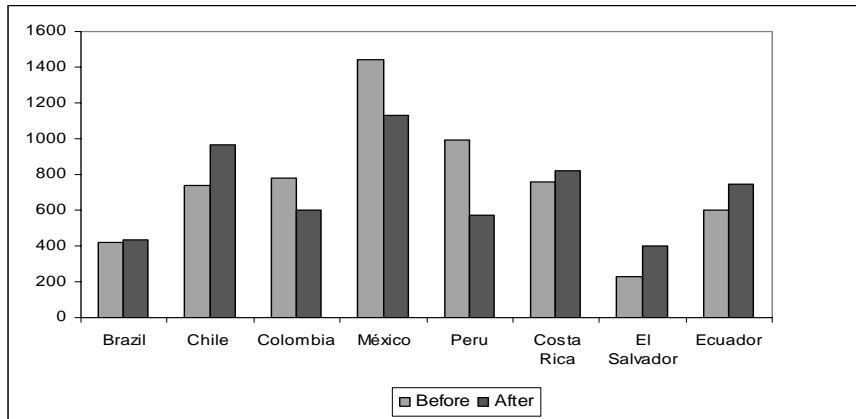
The discussion in section 2 made clear that regardless of whether trade reforms generate aggregate gains, not everyone in the economy will benefit, and trade liberalization in the late eighties and early nineties actually led to increases in income inequality in many countries in Latin America. However, indexes of income inequality are aggregate measures and increases in income inequality may be consistent with declines in poverty. This section focuses exclusively on the impact that trade reforms in Latin America had on the region’s poor.

<sup>27</sup> De Ferranti, Perry, Ferreira and Walton, (2004),” *Inequality in LAC: Breaking with History?*”

Recent cross-country evidence (Dollar and Kraay, 2004) shows no statistically significant impact of trade on the income of the poor in a sample of 72 developing countries and 24 developed countries. This is not surprising, given that as argued in the previous section, the impact of trade on income inequality is inherently a function of relative endowments and initial conditions (e. g. tariff structure and other regulations and policies). To find a statistically significant relationship would have meant that there is a simple homogeneous relationship between trade reform and individuals' income (or income inequality) than the one discussed in section 2.

A casual look at the evolution of the income of the poor in Latin America before and after trade reforms gives an ambiguous picture. Of the 10 countries for which we have data on the income of the poor before and after trade liberalization, six countries show an increase in real income, but four countries experience a decline in the income of the poor after trade reforms. (see Figure 3.1).

**Figure 3.1**  
Income of the poor before and after trade reform



Note: Dollar and Kraay (2002) for the income of the poor and Wacziarg and Welch (2003) for the timing of trade reform.

The absence of a clear pattern is confirmed when combining our exploratory exercises regarding the timing of the reform and their impact on poverty, income and wage inequality. Results are summarized in Table 3.1. Costa Rica is the only country in the region for which we have data available that experienced a significant declined in wage inequality. This was –as perhaps expected—accompanied by an increase in the income of the poor. In Brazil and Mexico, however, where wage inequality increased the income of the poor declined after trade reforms. But even in some countries where wage inequality increased significantly, there were some increases in the income of the poor (Bolivia, Ecuador and El Salvador). This illustrates the difficulty of inducing the evolution of poverty by looking at the evolution of wage or income inequality.

**Table 3.1**  
Wage, income inequality and poverty before and after reform

	Wage inequality increased by more	Wage inequality changed by less than	Wage inequality decreased by more

	than 5 percent	5%	than 5 percent
Income inequality increased by more than 5 percent	<i>Bolivia, El Salvador, Guatemala, Mexico</i>	Argentina, <b>Colombia</b>	
Income inequality changed by less than 5%	<b>Brazil, Ecuador, Uruguay,</b>	<i>Chile, Peru</i>	<i>Costa Rica</i>
Income inequality decreased by more than 5 percent			

Note: Countries with names in **Bold** are those in which the income of the poor declined by more than 5 percent after trade reforms. Countries with names Underlined are those that did not experience a change in the income of the poor (within a 5 percent margin) after trade reforms. Countries with names in *Italics* are those in which the income of the poor increased by more than 5 percent after trade reforms. If the country name is neither bold, underlined or in italics it means that we had no information regarding the income of the poor before and after liberalization.

Note however, that this *prima facie-evidence* does not imply causality, but simply that these changes happened at the same time. In the case of Mexico, for example, micro-econometric studies do confirm the increase in wage inequality after the reform (Nicita, 2004 and Robertson, 2000), but also show that the real income of the poor increased due to declines in the prices of their consumption goods. Figure 3.2 from Nicita (2004) shows the contribution to real income of changes in the cost of the consumption bundle and nominal and real income (wages, but also agricultural income for farmers), by income decile.<sup>28</sup> The right-hand-side panel suggests that the nominal income of the poor experienced negative changes, whereas the income of the richer households increased due to trade reforms. On the other hand, there were consumption gains across all income centiles (around 3 percent of their initial income), that benefited especially the poor (left-hand-side panel). Moreover, in the case of poor households consumption gains dominated income losses, which in turn imply an increase in real income for the poorest households in Mexico, as shown in the bottom panel of Figure 3.2. Thus, although the observed real income of the poor declined after the Mexican trade reforms in Mexico (as shown in Figure 3.1 and Table 3.1), this can not be attributed to trade reforms.<sup>29</sup> Similarly, Argentina seemed to have experienced significant increases in income inequality at the time of trade reforms as suggested in micro-econometric evidence provided by Porto (2006). He measured the impact of trade policy changes on individual wages and established causality. His results suggest that the poor experienced a six percent increase in real labor income that can be attributed to the trade reforms of the 1990s.

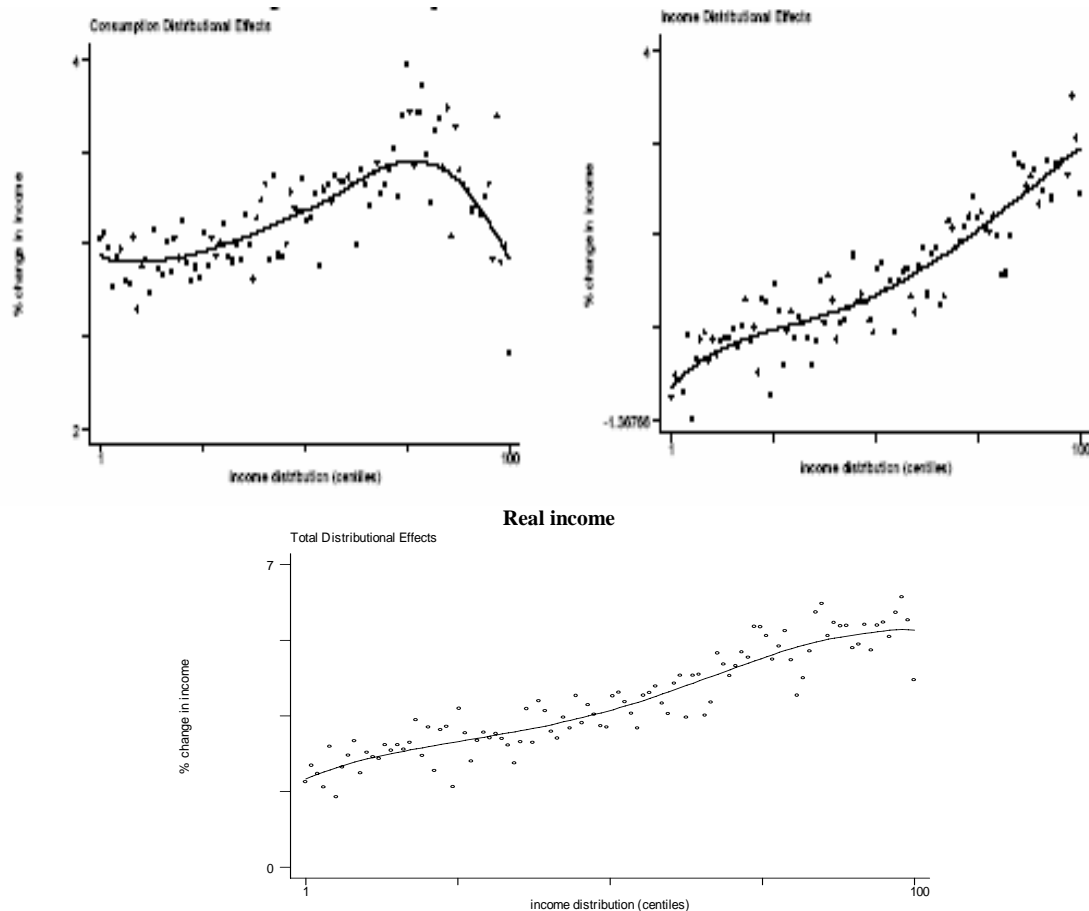
**Figure 3.2**  
**Contribution of the cost of the consumption bundle and nominal income to changes in real income after Mexican trade reforms by income centile**

Consumption bundle

Nominal Income

<sup>28</sup> Nicita (2004) estimates are based on estimates of pass-through and “Stolper-Samuelson”-type elasticities.

<sup>29</sup> Note that the decline in nominal income for the poor is of significant concern, given their vulnerability in the presence of poverty traps and absence of credit and insurance markets.



Source: Nicita (2004).

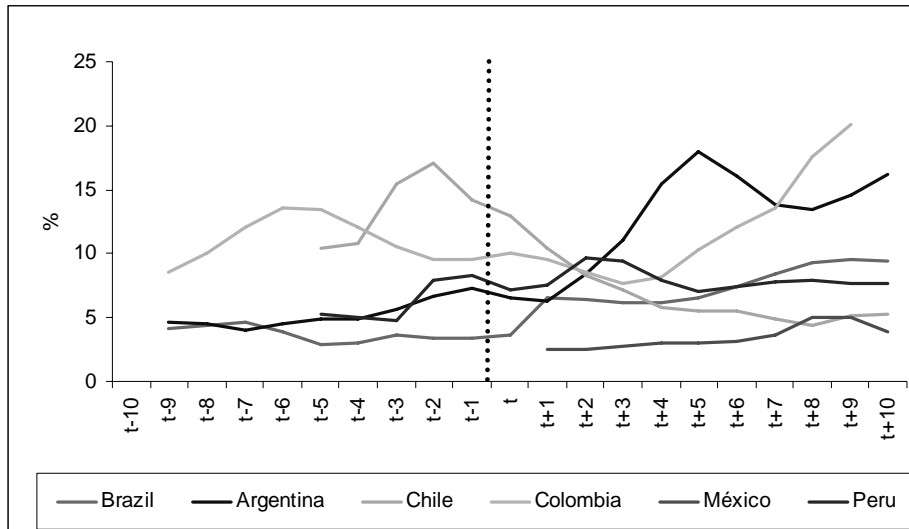
But changes in wages and the cost of the consumption bundle are only part of the story when measuring the impact that of trade reforms on the poor. As trade reforms get implemented, firms adjust, jobs are lost in some activities and employment opportunities are made available in other firms within or across sectors. Changes on the employment status or transitions into or out of formality induced by trade reform, as well as changes in individual income volatility will affect the income of the poor in the medium run. But perhaps more importantly they may affect their investment decisions in physical and human capital, which in turn will affect their long run income leaving them trapped in poverty. In the next sections, we first look at the impact that trade reforms had on the unemployment of poor individuals in Latin America. We then turn to the impact of trade liberalization on formal-informal employment (3.B) and finally on income volatility (3.C). Subsection 3.D. looks at the medium run implications of trade reforms on poverty through some of these channels.

### 3.A. Trade-induced changes in unemployment of the poor

Figure 3.3 shows the evolution of unemployment before and after trade reforms in Latin American countries. There is no single pattern: while unemployment increased after a couple of years in Argentina, Brazil and, transitorily in Peru, it actually was reduced in

Chile and Colombia and did not change much in Mexico. These observed trends, however, do not imply causality. Some studies have attempted to establish causality in specific countries with the help of microeconomic data, with heterogeneous results.

**Figure 3.3**  
**Unemployment (% of total labor force)**



Source : WDI

*Goldberg and Pavnick (2005)* could not find a statistically significant impact of trade reforms on urban unemployment in Colombia. But they argue that data constraints (a short time dimension) and the partial equilibrium nature of their exercise may partly explain the absence of impact. Moreover, they do not allow for differences on the impact of trade on unemployment across individuals, and therefore provide little evidence of whether the poor (or the unskilled) had stronger or weaker movements in and out of unemployment.

*Casacuberta and Gandelman (2005)* look for differences across types of workers (unskilled versus unskilled) in the adjustment process of Uruguayan firms' labor demand before and after the trade reforms that started in 1989. They found that trade reforms accelerated the adjustment process when firms are creating jobs for both skilled and unskilled workers. However, the adjustment process is also much faster when firms are cutting jobs of unskilled workers after the reforms (nothing is observed for skilled workers). This seems to suggest that unemployment of the skilled was reduced by Uruguay's trade reforms, whereas the impact on the unskilled remains ambiguous. However, unskilled workers are more likely to be able to move out of unemployment and benefit of the more rapid creation of jobs when labor mobility is facilitated by labor market reforms.

*Porto (2005b)* takes a more direct look at the potential impact of trade expansion on labor income. He estimates the impacts of eventual world agricultural trade liberalization on wages, employment and unemployment in Argentina. In the estimation of these wage and unemployment responses, the empirical model allows for individual labor supply

responses and for adjustment costs in labor demand. It is found that a 10 percent increase in the price of agricultural exports would cause an increase in the Argentine employment probability of 1.36 percentage points, matched by a decline in the unemployment probability of 0.75 percentage points and an increase in labor market participation of 0.61 percentage points. Further, the unemployment rate would decline by 1.23 percentage points (by almost 10 percent). Expected wages would increase by 10.3 percent, an effect that is mostly driven by higher employment probabilities. Interestingly he finds no statistically significant differences between poor and non-poor, but he observes that the employment effect contributes a larger proportion to the increase in the expected wage of the poor, whereas the wage effect dominates in the case of non-poor.

Similar effects were found in the case of increases in export prices in Brazil by *Krivonos and Olarreaga (2005)*. They estimated the impact of an eventual 10 percent increase in world sugar price (an important export commodity in Brazil), as a consequence of global trade liberalization, on labor income: wages and employment. Their results suggest that labor income would increase by an average 1 percent. The total impact would be 10 percent larger in the bottom income quintile. And as in Porto, the contribution of moves out of unemployment at the bottom of the distribution is much larger than at the top of the distribution (45 percent versus 28 percent of the total change in expected income).

The latter two exercises suggest that even though trade may lead to increases in wage inequality, the poor may be better off, not only because their real wages may be increasing (due to reductions in cost of their consumption bundle), but also because in some cases of trade expansion their employment opportunities could increase<sup>30</sup>. Such increases in labor demand for the unskilled may not necessarily translate in higher wages because there is a large pool of unskilled unemployed in most countries that puts downward pressure on unskilled wages.

In order to provide some further evidence on the role of trade openness on the unemployment of the poor in the region we run the regressions presented in Table 3.2. They explain unskilled and skilled labor unemployment (proxied by those unemployed with primary and secondary education for skilled workers and those with tertiary education for skilled workers) with country and year dummies, and GDP per capita as controls, and *Wacziarg and Welch (2003)* indicator of trade openness.<sup>31</sup> We also interact trade openness with indicators of abundance in natural resources to explore for heterogeneity in a region abundant in natural resources (the sample is composed of 27 countries in LAC for which data is available in the World Development Indicators).

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<sup>30</sup> Note, however, that this may seem to contradict the observation that in most countries the skilled to unskilled intensity has increased after unilateral trade liberalization. It is not. One can easily observe an increase in the skilled intensity in all sectors and the number of employment opportunities may increase in a much larger number for unskilled workers. To see this, assume that an economy moves from employing 10 skilled workers and 100 unskilled workers to employing 15 skilled workers and 140 unskilled workers. The ratio of skilled to unskilled employment increased from 0.100 to 0.107, but the employment opportunities for unskilled workers are 8 times larger, and can have a significant impact on poverty.

<sup>31</sup> Because *Wacziarg and Welch* indicator is a dummy, we correct the standard errors for potential correlation across observations before and after trade reform.

Results suggest that GDP per capita and trade openness have a statistically significant and negative impact on unemployment of both skilled and unskilled workers. On the other hand, countries that have a stronger comparative advantage in natural resources tend to have lower unemployment of skilled workers and higher unemployment of unskilled workers, and the impact of trade openness on unemployment is smaller and the sign can be reversed.<sup>32</sup>

**Table 3.2**  
**The impact of trade openness on the unskilled and skilled labor unemployment in LAC**

	Unskilled labor unemployment	Skilled labor unemployment
Log of GDP per capita	-0.26** (0.06)	-0.45** (0.11)
Trade openness	-0.32** (0.06)	-0.98** (0.23)
Index of Natural resources	0.07* (0.03)	-0.76** (0.07)
Trade openness * Index of natural resources	0.23** (0.03)	0.54** (0.20)
R-squared	0.63	0.64
Number of obserations	126	126

Note: The estimator is OLS with country and year. Standard errors corrected for correlation before and after trade reforms are provided in parenthesis. \*\* stands for significance at the 1 percent level and \* for significance at the 5 percent level.

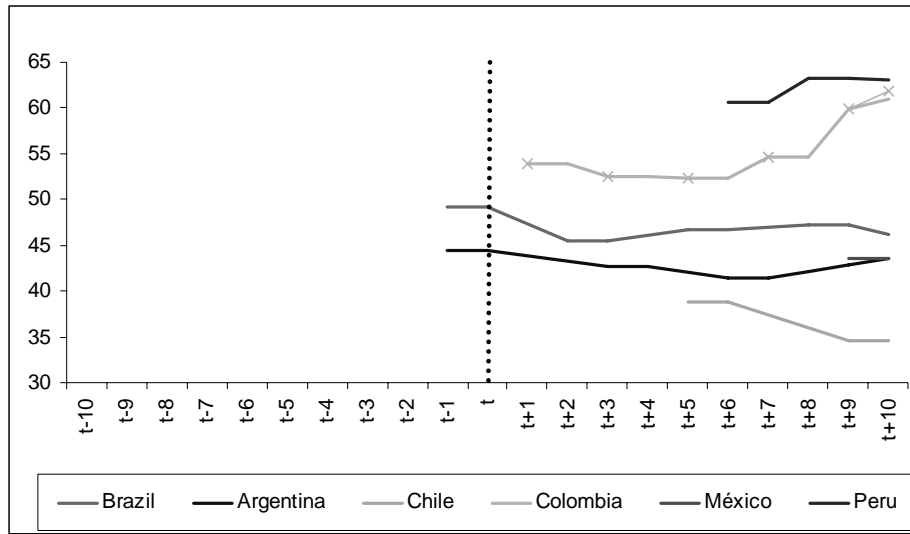
### **3.B. Impact on formal-informal employment and its consequences on poverty**

Almost half of Latin America labor force works in the informal sector. Moreover, there has been a rise in informal employment in some countries in the region (e.g. Colombia and Peru) during the 1990s, while trade reforms were implemented. However, it is unlikely that trade liberalization contributed to the increase in informality as has been claimed by many analysts<sup>33</sup>, as sectors more exposed to trade tend to have higher rates of formality (Figure 3.4 from De Ferranti, Perry, Lederman and Maloney, 2002). Also, natural resource based sectors, on which many LAC countries have a comparative advantage, do not tend to show higher informality and there is little evidence of a shift towards outsourcing with informal firms after trade opening (De Ferranti, Perry, Lederman and Maloney, 2002). Given that informality is concentrated in the non-traded sector, the increase in informality is more likely to be due to currency overvaluation that pushed the economy towards non-traded activities in the 1990s (see Figure 3.5 for the cases of Brazil and Mexico).

<sup>32</sup> When we disentangle the natural resource index into its different components, openness interacted with comparative advantage in food products and mining leads to less unemployment, whereas openness interacted with comparative advantage in mining and agricultural raw materials leads to more unemployment.

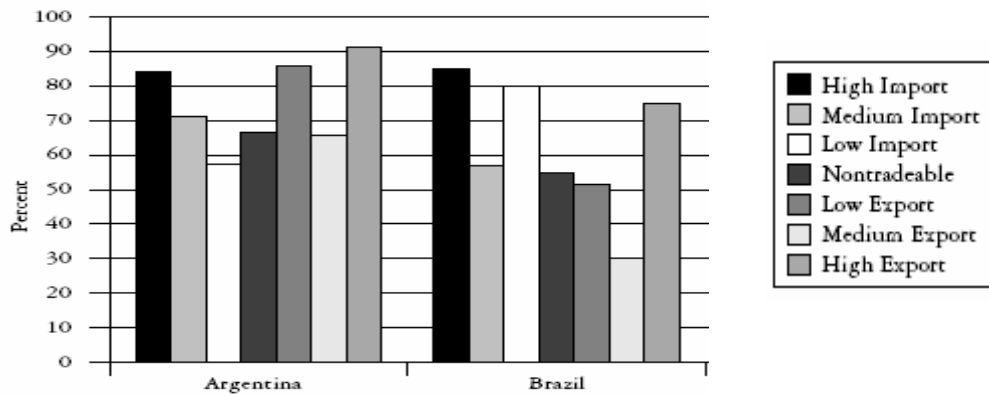
<sup>33</sup> See, for example, Morley, *ECLA* ( 2000)

**Figure 3.3**  
**Informality (% of total employment, urban area)**



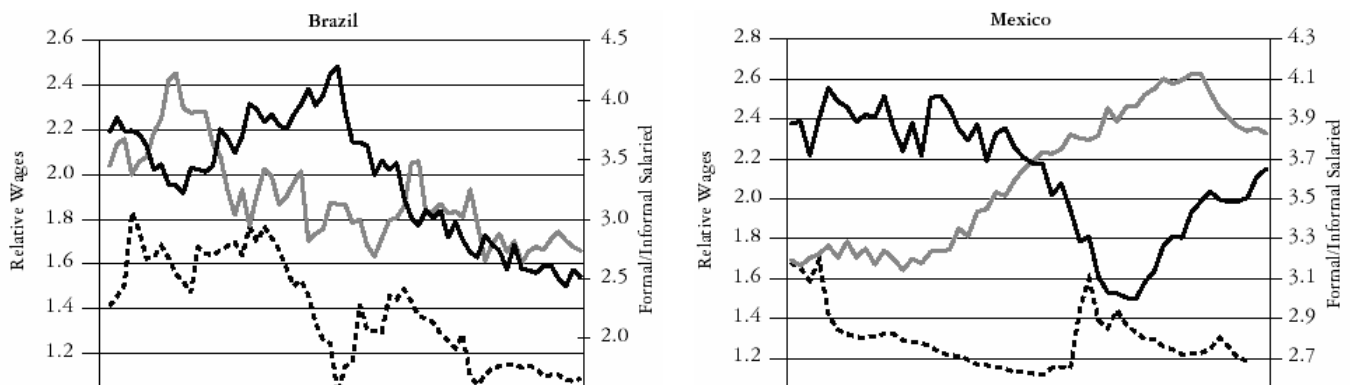
Source : ECLA. For Colombia, the data comes from de National Department of Statistics(DANE) and represents the seven major urban areas.

**Figure 3.4**  
**Formality Rates by Trade Exposure**



Source: De Ferranti, Perry, Lederman and Maloney, 2002. "From the natural resources to the knowledge economy"

**Figure 3.5**  
**Relative Formal/Informal Sector Sizes and Incomes and the Real Exchange Rate**  
**Informal Salaried**



Source: De Ferranti, Perry, Lederman and Maloney, 2002. "From the natural resources to the knowledge economy

The only available micro-evidence on the link between trade reform and transitions between formal and informal sectors is the paper by *Goldberg and Pavnick (2003)*. They focus on the trade liberalization experiences of Brazil and Colombia. They found no significant impact of trade liberalization on informal employment in Brazil. For Colombia they obtained some weak evidence of trade liberalization resulting in increased informality before the labor market reforms of the 1990's., but no evidence after the labor market reforms. This result highlights again the importance of considering the different institutional setups under which reforms take place.

Regardless of whether trade reform leads to more informal employment or not, one may wonder whether increases in informality are associated with more poverty. *Marcouiller, Ruiz de Castilla and Woodruff (1997)* found evidence of a formal sector wage premium in El Salvador and Peru, but not in Mexico once they control for individual worker characteristics (and selection). In the case of Mexico, they rather found an informality wage-premium.

This inconclusive evidence is complemented by *Maloney (1999)* study of employment transitions in Mexico, where he found little evidence of segmentation between the informal and formal sectors. Only 30 percent of workers that moved into the informal sector did it unvoluntarily. Those who voluntarily moved saw an increase in income close to 30 percent. The non-income aspect of the decision to move between formal and informal employment are also important and sometimes neglected when purely focusing on wage income (*Marcouiller et al. 1997*). On the one hand, the presence of benefits in the formal sector may increase the value of formal employment. On the other hand, independence and flexibility in the informal sector may increase the value of informal employment for those transitioning even though wages may be lower. *Maloney (1999)* suggests three reasons why informal sector employment may be a voluntary decision by workers, that does not imply lower wages, and therefore would have no clear consequences on poverty. First, because medical benefits programs –associated with formal employment— cover a worker's entire family, the marginal value of benefits to the second formal sector worker in a family is zero. This would seem particularly important for informally employed workers in households whose principal breadwinner may be formally employed: there is no reason to pay again the implicit tax for benefits already received. Second, administrative overhead costs of social security are high, and the benefits may have a low value given their cost. Third, rapid rates of job turnover (which may have been accentuated by trade liberalization) means that leaving a formal job does not necessarily imply the loss of generous separation benefits and pensions which are accumulated with seniority. Thus many informal salaried and self-employed workers (especially youth, married women and the unskilled) may voluntary choose this sector as an entry point to the labor force and to enjoy non-pecuniary benefits such as higher flexibility, exploit entrepreneurial abilities to improve mobility, and escaping taxing and social security regulations (see Bosch and Maloney, 2005 for evidence of this for Argentina, Brazil and Mexico).

To conclude, regardless of whether trade reform contributed or not to shift workers into informality, it is unlikely that this would have had any significant direct impact on poverty. It may, however, have an indirect impact on poverty due to the higher income volatility and lower protection against adverse shocks in the informal sector

### **3.C. Impact on income volatility and poverty**

There was a decline in Latin America's aggregate income volatility that coincide with the period of trade reforms in most countries<sup>34</sup>. But this was probably due to more to better macroeconomic policies, than to trade liberalization, if at all. The theoretical literature has suggested various channels through which trade reform might affect individual income risk. Most of them, but no all, suggest that trade liberalization may increase income risk. First, the increase in foreign competition leads to a reallocation of factors of production across firms and sectors that can increase income risk. Second, some have argued that increased foreign competition increase demand elasticities for goods produced domestically and therefore the derived demand elasticities, which implies that any given shock may lead to larger variations in wages and employment. On the other hand, a given shock may be better absorbed in a bigger market and therefore a more open economy may experience lower income volatility than a closed economy –unless the closed economy is subject to fewer shocks than the global economy. Thus, the answer to whether trade liberalization leads to more or less income volatility is necessarily empirical. Unfortunately –until very recently— there was only anecdotal evidence that linked trade reforms to individual income volatility (see Winters, Mc Culloch and McKay, 2004).<sup>35</sup>

A very interesting paper by Krebs, Krishna and Maloney (2005) filled this gap. They estimated time varying parameters of individual income risk for Mexico during the 1987-1988 period, built industry level and time varying estimates of income risk and correlated them with tariff levels and changes in tariffs. They found no statistically significant impact of tariff levels on income risk. In other words, workers in sectors with lower tariffs do not necessarily experience higher or lower income risk. However, they found that changes in tariffs do generate higher income risk: a tariff reduction of five percent raises the standard deviation of the persistent shocks to income by about twenty five percent. Such an increase in income risk can have important consequences on already vulnerable households, increasing the need for safety nets at the time of trade reforms. This again underlines the importance of accompanying trade reforms with adequate policies and institutions. The medium and long run consequences of increased income volatility are discussed in the next section.

### **3.D. Medium and long run effects of trade policy on the income of the poor**

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<sup>34</sup> See De Ferranti, Perry, Gill and Serven, 2002

<sup>35</sup> See also Rodrik (1998) who argues that more open economies are subject to more aggregate volatility and therefore need bigger governments.

In the longer run, the economy will continue to adjust to the new incentives and it is likely that these adjustments will become increasingly important to determine the long run impact of trade reforms on poverty. These adjustments refer, for example, to human capital investment decisions. Faced with changed wages for skilled and unskilled labor, individuals may review their decisions. For instance, if the skill premium increases with trade, there will be incentives to increase the average educational attainment. This implies that individuals will become more educated, with positive private and aggregate effects. But education policies need to follow to ensure that everyone can indeed invest in education as trade reform increases the incentives to invest on it.

In terms of production decisions, if prices of certain crops remain higher and production is sustainable and profitable, farmers may decide to acquire the knowledge that is needed for effective cultivation or may decide to upgrade the capital stock required to start production (oxen carts, ploughs, high-yield seeds). Similarly, firms may exploit the new trading opportunities by investment in physical capital and investing in R&D to increase productivity. Or firms may adjust the quality of their goods. These responses may lead to further growth in labor demand and further changes in wages and household welfare.

The potential increases in income risk may also have long term consequences in the absence of credit and insurance markets. Households facing higher income volatility are likely to invest less in education and may be more likely to require children to drop out of school when faced with important negative shocks. This can lead to persistence in low education levels among poor families (Perry, Lopez, Maloney, Arias, Serven, 2005). Well developed credit and insurance markets and conditional cash transfers –such as Oportunidades in Mexico— can help solve these problems (de Janvry, Finan and Sadoulet, 2005).

Some of these long-run impacts are often ignored in the discussion. This is probably because there is not enough variation in the data to have a sense of how long-run decisions respond to changed trade opportunities. But even if scarce documentation of these impacts exists, we need to emphasize its importance. Long-run changes imply further household adjustments, and household adjustments imply cushions to negative shocks and boosts to positive ones. This is specially true if the aggregate effects of trade liberalization on growth are positive. Thus, even if trade liberalization may increase inequality and even poverty in the short run, the positive long run effects on growth are likely to lead to poverty reduction in the long run. Perry, Lopez, Maloney, Arias and Serven, 2005 obtain precisely this result for trade openness for a large panel of countries.

#### **4. The importance of complementary policies**

The literature on trade and growth has long argued that trade reform is not a silver bullet: other policies are needed for countries to develop. More recently, the literature has argued that the impact of trade reform on growth itself may depend on other policies, regulations and institutions. For example, Banerjee and Newman (2004) have a model in which lack of financial development and sluggish factor mobility make poor countries lose from trade openness, as unproductive sectors are wiped out by foreign competition

but the capital and labor attached to them fail to divert to more efficient uses. Acemoglu and Zilibotti (2001), show that access to imported intermediate inputs and capital goods does not lead to productivity improvements in developing countries that fail to improve their human capital (to adopt the new technologies) and to enforce intellectual property rights (to encourage the development of technologies best suited to their skill mix).

The empirical evidence quickly followed: Bolaky and Freund (2004) show that trade does not lead to higher growth in economies with excessive business and labor regulations. Increased openness is, if anything, associated with a lower standard of living in heavily-regulated economies. Excessive regulations restrict trade-induced growth because resources are prevented from moving into the most productive sectors and to the most efficient firms within sectors. In addition, in highly regulated economies, increased trade is more likely to occur in the wrong goods—i.e. goods where comparative advantage does not lie. Their results imply that regulatory reform is not only beneficial per se, but it also enhances the benefits of trade liberalization.

Chang, Kaltani and Loayza (2005) present some interesting panel evidence (Bolaky and Freund is cross section) on how the growth effect of openness depends on a variety of structural characteristics. For this purpose, they use a non-linear growth regression specification that interacts a proxy of trade openness with proxies of educational investment, financial depth, inflation stabilization, public infrastructure, governance, labor-market flexibility, ease of firm entry, and ease of firm exit. They find that the growth effects of openness are positive and economically significant in the presence of relatively flexible labor market and firm entry and exit regulations (the estimates for other interactions were not robust across specifications).

Perhaps surprisingly, the literature on how other policies, institutions or regulations may affect the poverty and income inequality outcomes of trade reforms is almost non-existent. It is clear however, that as in the case of GDP growth, the impact of trade reform on the income of the poor could be boosted or even change sign in the presence of different institutional setups and complementary reforms.<sup>36</sup> On the consumption side, these complementary policies may be linked to deregulation of markets, so that lower prices of key staples will be indeed transmitted to the poorest households (like in marketing board reforms). On the farm production side, these variables may be linked to road infrastructure, credit and insurance programs, technical assistance, and health services that would allow farmers to switch to more profitable crops (or lack of them would hinder the switch). De Ferranti, Perry, Lederman and Valdes 2005 present evidence in this direction. On the employment side, complementary variables can be linked to the investment climate that affects the way in which firms can successfully compete in international markets, such as labor laws, firm entry and exit regulations, as well as to financial development and skill upgrading. On the unemployment side, these refer to key institutions that reduce labor search costs and facilitate overall labor market

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<sup>36</sup> This is one of the rationales behind the call for more “aid for trade” in the current WTO round. Trade liberalization may not be enough to positively and significantly affect the livelihood of the poorest segments of the population in the poorest countries (see Hoekman and Olarreaga, 2006).

adjustment mechanisms, such as training and education. On the income risk side, access to insurance markets and affordable credit are likely to be important.

In this section, we propose to take a first step in this direction. We illustrate the key interrelationship between trade reforms and other policies by undertaking two exercises. First we provide micro-level evidence that suggest that the presence of other reforms may affect the way in which trade liberalization affects wage inequality. This is done by focusing on the differential impact of tariff changes on wages and on wage inequality in two different episodes of trade liberalization of the Argentine economy. The first one is the liberalization of the 1970s and early 1980s. The other one is the trade liberalization of the 1990s. Second we provide some cross country evidence by merging the datasets of Chang, Kaltani and Loayza (2004) with Dollar and Kraay's datasets. This allows us to see the extent to which other policies affect the impact of trade reforms on the income of the poor in LAC.<sup>37</sup>

#### 4.A. Complementary reforms and wage inequality<sup>38</sup>

Argentina undertook two trade reforms in the last three decades. The first (failed) episode occurred in the late 1970, and the second one in the early 1990s. These two trade reforms have peculiar features that make them different (like initial levels of tariffs, for instance). But the two major differences, perhaps, were the nature of the other reforms that took place at the same time,<sup>39</sup> and the entry of China and India in world markets as an important competitor for unskilled-labor intensive products. In what follows, we exploit these differences in concurrent reforms and entry of a potential competitor in world markets to better understand how a given reduction in tariffs can affect the skill premium in different ways depending on other circumstances that characterize the economy.

Our analysis builds on a recent paper by Galiani and Porto (2005). They built an unusual historical data sets of tariffs and wages spanning the 1974-2001 period in Argentina. This comprises almost 30 years of data on sector level tariffs (at the 3-digit level of the ISIC classification) and individual wages. We use these data to estimate the following trade-wages model. We regress the log of the wage of individual  $i$ , in industry  $j$ , at time  $t$  ( $\ln w_{ijt}$ ) on a number of individual characteristics ( $x_{ijt}$ ) and the log of the tariff in industry  $j$  at time  $t$ ,  $\ln \tau_{jt}$ . That is,

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<sup>37</sup> Note that even within LAC there could be significant heterogeneity as argued earlier and our preferred methodology is based on case studies using micro-econometrics. However, case studies cannot give a comprehensive view unless there is a broad range of them. Cross-country regressions will allow us to take a first quick look at this question, but the absence of clear results can partly be attributed to the imposed homogeneity of the impact of trade policy on poverty across countries. Given the importance of these issues, it would be very useful, both from an academic and a policy perspective, to focus more resources on detailed case studies of how trade reforms are interlinked with selected policies and what the implications of these links in terms of poverty and inequality.

<sup>38</sup> We are grateful to Guido Porto for his inputs into this section.

<sup>39</sup> While the liberalization of the 1970s consisted mainly of tariff reductions, the 1990s were a period of comprehensive reforms including financial and banking reforms, deregulation of services, privatization of public enterprises, labor market regulations, etc.

$$(1) \quad \ln w_{ijt} = x_{ijt}\beta_t + \delta_t \text{EDUC}_{ijt} + \alpha \ln \tau_{jt} + \gamma \ln \tau_{jt} \text{EDUC}_{ijt} + I_j + Y_t + \mu_{ijt},$$

where EDUC are educational dummies (unskilled, semiskilled, skilled),  $I_j$  is an industry fixed effect and  $Y_t$  is a survey effect. In this formulation, both the returns to schooling and the returns to age are allowed to vary from year to year. Further, we work with three definitions of skills: unskilled labor comprises workers with at least primary education; semiskilled labor includes workers with secondary education; and skilled labor is represented by college graduates. By including survey effects and industry dummies, we control for changes in exchange rates (devaluations and appreciations) and industry-specific shocks so that the impacts of tariffs are not confounded by specific shocks or by aggregate shocks (related to policy or business cycle). These fixed effects help control for unobservable effects that would produce a spurious correlation between tariffs and wages.

We estimate a model like (1) for the liberalization of the 1970s and another for the liberalization of the 1990s. We plan to compare the different estimates of  $\alpha$  and  $\gamma$  to see how the impacts of trade on the skill premium depend on other concurrent policies and differences in the external environment.

Our main findings are reported in Table 4.1. The first column lists the results for the liberalization of the 1970s and the second, for the liberalization of the 1990s. We can see how the impacts of the trade reforms were different in the two periods. During the first liberalization episode, the average wage reacted positively to tariffs, so that the tariffs cuts led to a decline in wages (see section 2 for potential explanations). In addition, we don't find any impact of the tariff changes on the skill premia, either for the semiskilled or the skilled workers (the interactions of the tariff with the educational dummies are not statistically significant). During the second episode of trade liberalization, during the 1990s, the positive association of tariffs and average wages is still observed. However, we now estimate negative and significant interaction terms for the semiskilled and the skilled workers.

**Table 4.1**  
**Tariff Reforms, Complementary Reforms and the Skill Premium**

	Liberalization of the 1970s	Liberalization of the 1990s
log tariff	0.824*** (0.364)	0.128*** (0.043)
log tariff * semiskilled	-0.032 (0.098)	-0.128*** (0.048)
log tariff * skilled	0.21 (0.241)	-0.442*** (0.111)
time-varying returns to schooling	Yes	Yes
time-varying return to age	Yes	Yes
time effects	Yes	Yes
industry effects	Yes	Yes
R-Squared	0.86	0.35
Obs	7922	11131

Our estimates suggest the following dynamics of wages after the two tariff reforms. During the 1970s, trade liberalization led to an average decline in wages, with no overall distributional consequences on wage inequality. However, the reforms of the 1990s led to i) a decline in the wages of the unskilled workers; ii) no significant change in the wages of the semiskilled workers, and iii) an increase in the return to high skills. We conclude that the response of wages was different in these two periods. And while part of the story may be due to differences in the tariff changes in the two liberalization episodes and changes in the external environment, another part of the story is probably due to the concurrent policies that were taking place during the 1990s and the entry of China and India as important suppliers of unskilled-labor intensive products in world markets. For example, the openness of the 1990s, together with the privatization of most of the Argentine service sector, could have led Argentine firms to upgrade the quality of their exportable products, thus leading to an increase in the relative demand of skills and in the skill premium. Similarly, the financial reforms could have complemented the new trading opportunities to induce firms to finance and engage in skilled biased technical change. The competition imposed by Chinese products may have also pushed Argentina into specializing into more skilled intensive products and kept the pressure on the wage of unskilled workers. These stories, while not formally proven by our analysis, clearly suggest that the interaction of tariff reforms with other concurrent reforms and events may play a role in the impacts on wage inequality.

#### **4.B The role of complementary policies in explaining the impact of trade reform on the income of the poor: LAC cross country evidence**

We combined the datasets of Dollar and Kraay (2002) and Chang, Kaltani and Loayza (2005) to try to explore the role played by complementary policies in explaining the heterogeneity of the impact of trade reform in LAC on the income of the poor. We considered as complementary policies labor market flexibility, entry of firm flexibility, closing of firm flexibility, a governance indicator and secondary education enrolment (as a proxy for education policies). All these variables were borrowed from Chang, Kaltani and Loayza (2005). The variable to be explained is the log of average income in the bottom quintile, borrowed from Dollar and Kraay (2002). Control variables include the log of GDP per capita, and country and year dummies. The trade openness indicator is as before the one provided by Wacziarg and Welch (2003). The sample is given by matching of the two datasets and contains 17 LAC countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, El Salvador, Uruguay and Venezuela). There is a maximum of 6 observations per country. Thus, the sample is small and inferences should be made with caution.

Table 4.2 summarizes the results. The first column suggest that trade openness had a positive but insignificant impact on the income of the poor. The second column suggests that labor mobility may help increase the income of the poor in the presence of trade

reforms, but its effect is again statistically insignificant.<sup>40</sup> The third column suggest that entry of firm flexibility may help enhance the income of the poor in the presence of trade reforms, whereas flexibility to close firms (fourth column) may hurt the income of the poor. While education has a positive impact on the income of the poor (fifth column), its interaction with trade openness is not statistically significant. Trade reform accompanied by better governance (sixth column) will have a positive impact on the income of the poor. The last column introduces all variables simultaneously and confirms the importance of good governance and firm entry flexibility in leading to a positive impact of trade openness on the income of the poor.

**Table 4.2**  
**The role of complementary policies in explaining the impact of trade openness on the income of the poor**

	Log income of the poor	Log income of the poor	Log income of the poor	Log income of the poor	Log income of the poor	Log income of the poor	Log income of the poor
Log GDP per capita	0.67* (0.34)	0.83 (0.67)	0.64* (0.32)	1.05** (0.51)	0.57** (0.27)	0.76*** (0.20)	0.93** (0.32)
Openness	0.09 (0.08)	-0.03 (0.30)	-0.42 (0.33)	0.62** (0.30)	-0.58 (0.71)	-0.67*** (0.12)	0.01 (0.85)
Openness*labor market flexibility		0.27 (0.87)					-0.82 (0.64)
Openness*Firm entry flexibility			0.82 (0.49)*				2.54* (1.55)
Openness*Firm closing flexibility				-1.08** (0.44)			-0.43 (0.40)
Education					0.16* (0.09)		0.14** (0.66)
Openness*Education					0.18 (0.19)		-0.50 (0.50)
Openness*Governance						1.78*** (0.23)	1.90*** (0.42)
R-squared	0.93	0.91	0.96	0.96	0.96	0.98	0.98
# of observations	74	68	72	68	72	72	68

Note: All regression are run with country and year dummies and standard errors provided in parenthesis are corrected (non parametrically) for correlation in the error term before and after trade reform in each country. \*\* stands for significance at the 5 percent level and \* for significance at the 10 percent level.

## 5. Summing up: short and long term effects of trade liberalization on inequality and poverty

Although the impact of trade reform on poverty, wage and income inequality was quite varied within Latin American countries, a broad view at episodes of trade reforms in the

<sup>40</sup> Note that as in Chang et al. (2005) the governance index, labor and firm entry and closing flexibility do not enter the regression as they have no time variation. World Bank (2005) and Chang et al (2005) argue that there is quite a bit of hysteresis in these variables and therefore a country dummy can be a good enough control for the direct impact of these variables.

region in the late eighties and early nineties suggests that they were in most cases accompanied by increases in wage inequality and more moderate increases in income inequality. Regardless of whether wage and income inequality were rising or not, trade reform tended to be accompanied by reductions in poverty, mainly through reductions in the cost of the consumption bundle of the poor, as well as moves out of unemployment. This is important because as the income of the poor increases with trade reform, poverty traps become easier to avoid and the poor may be more able to undertake the necessary investments to adjust in the presence of market failures (e.g., absence of credit or insurance). Policy complementarities matter (with education, access to credit, insurance and flexible entry and exit of firms and labor markets, access to infrastructure and technical assistance by poor farmers) and can also help the poor maximize the new economic opportunities offered by trade reforms.

The increase in wage inequality in Latin America at the moment of trade reform contrasts with what apparently happened when the East Asian Tigers open up at the end of the 1960s, and with what could have been expected from simple two factors/ two goods/two countries models of neo-classical trade theory. We argue in this paper that there is actually no puzzle. Most of the static effects of trade liberalization examined should have been expected to go in the direction of increased demand for skills and thus of wage inequality, given both LAC's initial structure of protection (that benefited mostly unskilled intensive sectors) and relative endowments: a region rich in natural resources, which are more often than not complementary to capital and skills, and intermediate in capital abundance (as measured by capital to unskilled labor ratios), especially with respect to countries such as China and India that have a large pool of unskilled workers and were already integrating to the world economy at the time of the Latin American opening. Apparently quantitatively more important, labor reallocation took place within sectors as product mix changed –more skilled intensive products/processes appeared and grew at the margin, as through outsourcing- and more productive and innovative firms - which normally demand higher skills- grew at the expense of less productive and innovative, in an environment of heightened competition. Faster transfer and adaptation of skill biased technical change further strengthened relative demand for skills. It is thus not surprising to observe a generalized increase in relative demand for skills (specially at tertiary level) in the years following trade liberalization, which led to higher skilled premiums for workers with tertiary education (though not for workers with secondary education, given the sharp increases in secondary enrollments in many countries).

Beyond skill premiums and wage inequality, though, the direction of other effects discussed is mixed, and they might have had some equalizing effects on household income distribution. Increases in rents for holders of property rights on natural resources probably contributed to income inequality in most countries, though they also benefited small farmers. Changes in consumer prices appear to have benefited more the poor, as would be expected if many of the unskilled intensive former protected activities were producers of basic goods, which explains why in many countries the real income of the poor raised substantially after trade reforms. In some countries there were temporary spells of unemployment that tended to increase inequality, while in others reductions in

unemployment and/or some effects on increased labor participation might have had the opposite effect. Importantly, observed increases in informality (though the relation between higher informality and inequality is by no means obvious) were mostly due to other events and policies, that led to an unexpected initial increase in prices and share of non tradables (exchange rate appreciation caused by increased capital flows, capital account opening and monetary policies), and can not be attributed to trade opening.

Policy complementarities can ensure that the poor benefit from otherwise poverty-increasing trade reforms. The evolution of adverse effects on skill premiums and wage inequality over time will depend on supply responses in education and training by workers, firms and Government. A fast response in skill upgrading will reduce inequality effects over time and probably augment positive growth effects. Government actions to increase supply and quality of public education, to help overcome liquidity and informational constraints by poor families and workers and to evolve towards more competitive and efficient training and remedial education services, would play a key role in such a response. Increased access to credit and insurance are also likely to allow poor households to adjust better to reforms and take full advantage of the new opportunities offered by trade liberalization. More flexible labor markets and entry and exit regulations for firms will also allow productive firms to more easily enter and increase their share in potentially more profitable activities. Finally, increased access to infrastructure, financial services and technical assistance would facilitate small farmers' adjustment to new challenges and opportunities.

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