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THE WELFARE IMPACT OF PROTECTIONISM IN
LATIN AMERICA: EVALUATION OF
ALTERNATIVE SCENARIOS

Depetris Chauvin Nicolas
Ramos Priscila

The Welfare Impact of Protectionism in Latin America: Evaluation of Alternative Scenarios*

Nicolas Depetris Chauvin[†] Maria Priscila Ramos[‡]

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Abstract

This paper studies the welfare impact of alternative scenarios of trade protectionism and liberalization in four large Latin American countries, namely Argentina, Brazil, Colombia, and Peru. The impact of the different trade policies is assessed in two different ways. We first use the multi-sectoral and multi-regional computable general equilibrium MIRAGE model to assess the effects of trade policy on GDP, exports, imports, terms of trade, real wages, and welfare. The second approach is to follow the trade and poverty literature and use the price and factor remuneration changes from each simulation to feed them into household survey data and assess the welfare effect on households. The simulations show that in the four countries unilateral protectionism has only short term benefits while the other protectionist scenarios reduce welfare significantly. Liberalization, on the other hand, would improve welfare in most cases. In the case of Argentina, the analysis using household survey data shows that protectionism has negative effect across the entire income distribution and the effect is particularly severe for the poorest households. Liberalization scenarios improve households' welfare in most cases. However, a FTA with China would negatively affect households in Argentina.

Keywords: CGE model, Microsimulations, Protectionism, Liberalization, Latin America .

JEL Classification: C68, F13.

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[†]IIEP-Universidad de Buenos Aires (depetris@gmail.com).

[‡]FACE-UADE and CEPII (maramos@uade.edu.ar)

1 Introduction

At the onset of the current crisis, government of major economies pledged to refrain from protectionist policies. At least in tariffs terms most countries upheld their pledges. Tariff protectionism increased only for a small set of countries. However, trade volume collapsed following the crisis prompting several analysts to look for the causes beyond tariff barriers. Researchers have found an increase use of murkier forms of protectionism (see for instance Baldwin and Evenett (2009)). The findings of the Global Trade Alert reports indicate that countries have been proactive in implementing protectionist non-tariff measures (see for example, Evenett (2010)). Latin American countries have not been the exception in this trend. Argentina and Brazil are among the most prominent countries that have reverted to protectionism using a battery of non-tariff barriers. On the other hand, countries like Colombia and Peru have resisted the temptation to increase the level of protection.

The relationship between trade and development is in general complex and in Latin America the political support for a more or less restrictive trade regime has changed over time. The policy prescription of trade liberalization was popularized in the 1980s as recognition of the efficiency distortions generated by the import substitution industrialization strategy and the disappointing economic performance of the inward oriented Latin American countries in the 1960s and 1970s which contrasted with the success of the outward oriented East Asian Tigers. If free trade is good, then why do countries interfere with free trade? Beyond the infant industry argument popularized by the import substitution model, it is important to recognize that trade produces winners and losers. Trade liberalization changes prices and will require adjustments than in the short term may lead to unemployment and a lower level of economic activity. Also, in the short-run some countries can affect the terms of trade favorably increasing protection. However, these benefits quickly disappear if other countries retaliate and close their economies.

In this paper, we study how protectionism may affect welfare in the short run in four Latin American countries, namely Argentina, Brazil, Colombia and Peru. We consider not only cases of unilateral increases of protectionism but also at the regional and worldwide level. For comparison purposes, we also explore the welfare effect of increased liberalization. Our analytical methodology has two main parts. The first is a computable general equilibrium model of trade. The model provides the tools needed to simulate the changes in the outcomes of interest such as welfare, GDP, exports, imports, terms of trade, factor remunerations and prices for different categories of goods. Our simulations cover a large number of trade policy scenarios. The second component utilizes household surveys to assess the welfare impacts of those changes. We follow a standard first order effects approach, as in Deaton (1989, 1997). Using the microdata from the household surveys, we use expenditure shares and labor income shares to evaluate the income impacts of a given trade policy scenario across the entire income distribution.

The rest of the paper is organized as follows. In the next section we review the protection trends in the four Latin American countries in this study and we summarize the economic literature on the effects of the last financial crisis on the level of protectionism. The trade model features, the methodological approach to estimate households' welfare, the data and the protectionism and liberalization scenarios are described in Section 3. The results of the simulations are presented

and discussed in Section 4, while household welfare analysis is discussed in Section 5. Finally, we give our final remarks in the last section.

2 Trade and Protection Patterns in Latin America during the crisis

In contrast to the progress made during the multilateral negotiations at the WTO, the international financial crisis that started in 2008 resulted in a sustained increase of trade restrictions. The policies that governments around the world have been implementing in order to contain or reduce the harmful effects of the recession on the activity level and particularly on employment, can be considered a double-edged sword given the constraints posed to imported inputs and the possible resources diversion from most efficient exporting sectors. These kind of decisions seem to forget that an important part of their countries demand is outside geographical borders. Changes in trade volumes and patterns, the available data on protection and a recent but growing economic literature on the effects of the crisis provide evidence of a protectionism trend at the world level and in particular in the Latin America.

Although we are tempt to compare the consequences of the present crisis to those of the 1930s one, neither the trade policies nor the international trade context are similar. Nowadays the increase in trade protection is constraint by WTO commitments and Free Trade Agreements, thus trade policy is taken other forms than simple tariffs. Applied tariffs have not recently changed due to international commitments, and even in many Latin American countries, such as Argentina and Brazil, they are far below to the bound-WTO average tariffs (i.e. bound tariffs in Argentina, Brazil and Colombia are on average 35% and in Peru it is 30%). Hence, these countries display a considerable scope to increase import tariffs without violating their WTO tariff commitments.

Table 1: Applied Tariff Protection: selected Importers from Latin America

Partners Importers	Developed countries			Developing countries			LDC countries		
	Agri	Manuf	Textile	Agri	Manuf	Textile	Agri	Manuf	Textile
Argentina	12.4	13.1	19.2	11.3	9.4	18.3	8.8	5.6	19.1
Brazil	11.7	12.6	18.1	9.6	8.4	18.1	9.5	1.1	15.0
Colombia	15.1	9.4	17.7	15.3	9.1	17.3	12.7	9.2	15.2
Peru	16.7	12.1	17.5	15.8	11.7	16.7	13.5	12.0	15.2

Source: MAcMap-HS6-V3, CEPII.

Notes: Protection data corresponds to equivalent ad valorem applied tariffs in Argentina, Brazil, Colombia and Peru over Agricultural and Manufactures (all and isolating Textile) products from Developed, Developing and LDC partners. These averages equivalent ad valorem are built using the reference group trade weighting scheme.

Many authors talk about “murky protectionism” because of measures that are very difficult to evaluate. Gamberoni and Newfarmer (2009) highlight that different kind of subsidies, even including “green” subsidies (Evenett and Whalley, 2009) are intensified in developed countries while not only tariffs but especially non-tariff barriers are mostly used by developing economies. For instance, Argentina has recently imposed non-automatic licensing requirements on auto-parts, textiles, TVs, toys, shoes and leather goods. Stronger rules, such as licensing arrangements

and import controls (i.e. similar to the “Buy America” provision in the US), are provoking conflicts between Brazilian and Argentinean governments and local private sectors. Moreover, there have been a proliferation of anti-dumping measures in these Latin American countries, which mostly affect imports from Asia.

Empirical works (Henn and McDonald, 2011; Evenett, 2009) look for protectionism evidence mainly using the Global Trade Alert data because it provides a large varieties of trade instruments others than classical tariffs or subsidies with a large coverage at country and detailed product levels.

Table 2: Recent Measures restricting trade relations: selected importers from Latin America

Measures	Argentina			Brazil			Colombia			Peru		
	Green	Amber	Red	Green	Amber	Red	Green	Amber	Red	Green	Amber	Red
Bail out / state aid measure	1	5	7	0	0	1	0	0	0	0	0	0
Competitive devaluation	0	0	0	0	0	0	0	0	0	0	0	0
Consumption subsidy	0	0	0	0	0	0	0	0	0	0	0	0
Export subsidy	0	0	1	0	1	3	0	0	0	0	0	0
Export taxes or restriction	3	0	8	0	0	1	0	0	1	0	0	0
Import ban	0	1	2	0	0	0	0	0	0	0	0	0
Import subsidy	0	0	0	0	0	0	0	0	0	0	0	0
Intellectual property protection	0	0	0	0	0	0	0	0	0	0	0	0
Investment measure	1	0	1	2	0	2	0	1	0	0	0	0
Local content requirement	0	0	1	0	0	2	0	0	0	0	0	0
Migration measure	0	0	0	1	0	0	1	0	0	0	0	0
Non tariff barrier (others)	0	5	74	0	2	0	0	0	0	0	0	0
Other service sector measure	0	0	0	1	0	0	0	0	0	0	0	0
Public procurement	0	0	0	0	0	4	0	0	0	0	0	0
Quota (including TRQs)	1	0	1	3	1	2	0	0	0	0	0	0
Sanitary and Phytosanitary Measure	0	0	0	0	0	0	0	0	0	0	0	0
State trading enterprise	0	0	0	0	0	0	0	0	0	0	0	0
State-controlled company	0	0	1	1	0	0	0	1	0	0	0	0
Sub-national government measure	0	0	0	0	0	0	0	0	0	0	0	0
Tariff measure	3	1	6	53	2	24	3	1	0	1	0	0
Technical Barrier to Trade	0	1	2	0	0	0	0	0	0	0	0	0
Trade defence measure	7	15	38	5	28	19	2	3	1	5	7	4
Trade finance	0	0	0	0	3	1	0	0	0	0	0	0
	16	28	142	66	37	59	6	6	2	6	7	4

Source: Global Trade ALert, June 2012. *Notes:* Data corresponds to the number of measures recety detected by the GTA in Argentina, Brazil, Colombia and Peru. They are classifies by type and according to their degree of market distortion.

The four countries chosen for this study show different patterns of protection (see Table 2 and Table 1). Even if comparing tariffs we find that trade protection is quite homogeneous across countries and products, other measures display a greater difference between Argentina and Brazil on one side, and Colombia and Peru on the other. Argentina has recently increased the number of very distorting measures (classified as red in the table), particularly focusing on non-tariff barriers (e.g. non-automatic licenses and other administrative and customs restrictions) and also on anti-dumping duties. Brazil follows its Mercosur partner with less than a third of the implemented restrictions classified as red measures, which mainly consists in tariffs and other safeguards and anti-dumping measures. Finally, Colombia and Peru have oriented their trade protection to trade defense measures from which only few of them are considered part of the red box.

Bussiere et al. (2011) find that even though the number of measure have been rising after 2008 (Global Trade Alert source), the economic impact remains moderate (see also Figure 1). Treaties and trade agreements limit tariffs increase. However, nowadays, the pressure for further protectionism measures is growing due to the vulnerable macroeconomic context, unemployment risk and the widening external imbalances. The problem is that protectionism may only increase these imbalances and in the long-run depress real GDP growth and competitiveness.

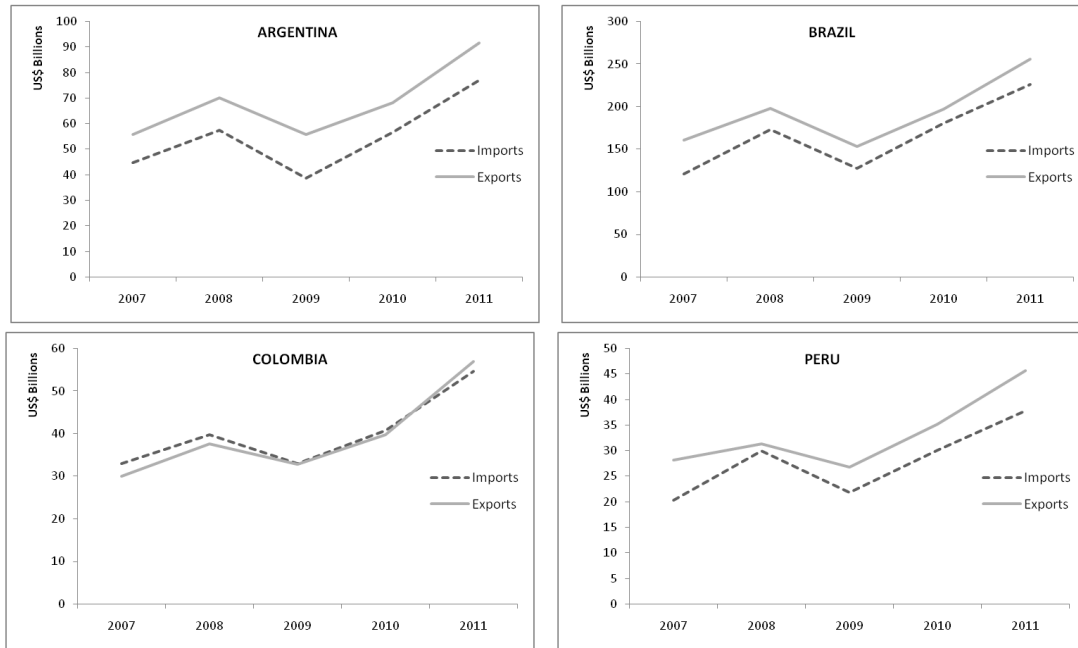


Figure 1: Trade during the crisis period: selected countries of Latin America (2007-2011, US\$ Billions) *Source: COMTRADE, UN.*

Kee et al. (2010) also evaluate trade protection through the overall trade restrictiveness indices calculated for a wide range of countries by comparing tariff schedules from 2008 and 2009. The non relevant increase of tariffs (except in some particular countries such as Argentina or Russia and in some particular products, such as in the automobile sector) and particularly the increase in anti-dumping measures only explained a negligible part of the observed trade collapse after the crisis. Thus, non-tariff measures such as bailouts and local content requirements to discriminate against imports could be one of the main factors explaining the trade fall.

Yi (2009) also points out that protectionism could be an obstruction on supply chains in a context where products are not anymore produced in only one country but being the result of an international network (i.e. nations are different nodes from a supply chain). Hence, the increase in trade barriers can thus trigger the “domino effect” in global trade collapse. Moreover, during the last ten years competitiveness in some exporting sectors were developed thanks to lower costs of imported inputs. The present protectionism trend only could erode this competitiveness and thus negatively affects economic activity and local jobs. In the same line of thought, Gawande et al. (2011) find that the rise in the intra-industry trade (varieties) and the fragmentation of production across global value chains (“vertical” specialization in different intermediate outputs and procedures) have also contained the pressure to a trade protection increase. These are possible consequences to keep in mind for Latin American countries because their past efforts to open their markets allowed them to developed some manufacturing sectors and the potential increase in import restriction could deteriorate that competitiveness reached some years ago.

During the first phase of the crisis, growth and employment remained strong in Latin America. However, in the last few quarters, unemployment and economic recession risk have been increasing in the region, and therefore the pressures for protectionism have intensified. Hence, retaliation

and its worst economic and social effects remain latent (Gregory et al., 2010).

3 The theoretical approach

3.1 The MIRAGE model

We use the multi-sectoral and multi-regional computable general equilibrium (CGE) MIRAGE model (Bchir et al., 2002a; Decreux and Valin, 2007), which has been developed and is used extensively to assess trade liberalization scenarios (e.g., Bchir et al., 2002b; Bouët et al., 2005, 2007; Decreux and Fontagné, 2008).

The demand side is modeled for each region through a representative agent, who saves a fixed part of his income and the rest of it is spent on commodities according to a LES-CES function. Products are distinguished according to their geographical sources (Armington hypothesis, Armington, 1969), using the GTAP (Global Trade Analysis Project) Armington elasticities estimated in Hertel et al. (2007). That is domestic products are assumed to benefit from a especial status for consumers, making them less substitutable by foreign goods. Moreover, manufactured products originating from developing and developed countries are assumed to be less substitutable between each other. The reason is that the model assumes they belong to different (price or) quality ranges and thus, competition among differentiated goods are less tough than between similar products.

On the supply side, each sector is modeled as a representative firm, which combines value-added and intermediate consumption in fixed shares. Intermediate consumption from the different sectors is aggregated using a nested Constant Elasticity of Substitution (CES) function, such as the one for the final consumption goods. Value-added is a bundle of imperfectly substitutable primary factors (capital, skilled and unskilled labors, land and natural resources). Installed capital stock is immobile while investment is the only adjustment device across sectors according to the capital return in each. Skilled labor is perfectly mobile across sectors and the value-added modeling takes into account its complementarity with capital. Unskilled labor is imperfectly mobile between agricultural and other sectors. Land is assumed to be imperfectly mobile between agricultural sectors and finally, natural resources are sector specific. All primary factors are in fixed supply. Moreover, production factors are assumed to be fully employed. Hence, negative shocks are absorbed by changes in prices rather than in quantities. All production factors are immobile internationally (i.e neither migration nor foreign direct investment are allowed).

MIRAGE has a sequential dynamic recursive set-up and imperfect competition modeling. We assume constant returns to scale and perfect competition in agrifood sectors, while firms in sectors which provide services and manufactured goods are assumed to face increasing returns to scale and imperfect competition (see sectors distinguished by * in Table 3). The macroeconomic closure assumes on one side, that investment is saving-driven and on the other, that the current account balance is assumed to be exogenous (and equal to its initial value in proportion to world GDP), while real exchange rates adjusts.

Since tariff structures in Latin American countries contains low tariffs and quite homogeneous

Table 3: Sector and country aggregation

Regions	Sectors
Mercosur	Food and Beverages
Argentina	Rice
Brazil	Wheat
Uruguay and Paraguay	Cereals
	Vegetables and Fruits
Andean Community	Oil seeds
Colombia	Sugar
Peru	Crops
Rest of Andean Community	Meat Cattle
	Other Meat
Rest of Latin America	Milk
Chile	Fishing
Central America and the Caraiibe	Fats
Rest of South America	Dairy products
	Food
Developed regions	Beverages
NAFTA	Clothing
EU27	Wool
Cairns Developed Countries	Textile (*)
Rest of Dveloped Countries	
Other Developing regions	Health and Education
China and Hong Kong	Health(*)
India	Education (*)
South African Countries	
Mediterranean Countries	House Equipment and Maintenance Goods
Russia Ukraine Belarus and Rest of ExURSS	Electronic devices (*)
Cairns Developing Countries	Machinery (*)
Rest of Developing Countries	Chemicals (*)
	Leisure goods
	Leisure (*)
	Transport and Communications
	Cars and Trucks (*)
	Transport Equipment (*)
	Transport
	Insurance, Financial and Business Services (*)
	Others
	Forestry
	Energy Products
	Primary
	Metal (*)
	Other Manufactures (*)
	Other Services (*)

Notes: Classification based on Latin American blocs, their trade partners and their main tradable products. We built a correspondence table with products disaggregation in household surveys.

(*) Sectors with increasing returns to scale and under imperfect competition conditions.

levels across products, trade restrictiveness mainly comes from non-tariff barriers (NTB) and other trade costs related to time. In order to consider different modalities of trade protection/liberalization for those countries, we work with a modified MIRAGE model to take into account trade costs that add up to the ordinary freight costs already present in the model - iceberg cost fashion (Decreux and Fontagné, 2008, 2011). Also, for trade facilitation modeling no implementation cost is assumed. However, countries may need to purchase modern equipments to improve procedure in ports and customs or even, divert skilled labors from other productive sectors. These costs are not considered in the model because of the lack of data. However, trade facilitation gains are quite significant that could outweigh any costs in the short-run.

Moreover, protection in services has in two different forms depending on sectors: in communication and transport it is modeled as an export tax and thus it benefits exporting countries by allowing some firms to increase their profit margins; in other services it is modeled as an additional iceberg trade cost.

3.2 Micro simulations

A useful way to study how trade affects households' welfare is by noticing that trade and trade policy affects the prices faced by producers and consumers. In consequence, we can investigate the trade-welfare link by tracing how trade policy affects prices and, in turn, how prices affect welfare. The price and factor remunerations changes will come from our simulations with the Mirage model.

The framework builds on standard agricultural household models, as in Singh et al. (1986), which we will modify to take into account that we will be dealing with urban households in middle income countries and therefore most households will be wage earners and will not produce agriculture goods. The unit of analysis is the household, denoted by h . To measure welfare changes, we begin by adopting the indirect utility function approach, as in Deaton (1997). We would later derive the same result using the expenditure function as in Dixit and Norman (1980) where we will incorporate the effects of labor income.

The indirect utility function of household h depends on a vector of prices \mathbf{p} and on household income y^h :

$$V^h(\mathbf{p}, y^h) = V^h\left(\mathbf{p}, x_0^h + \sum_j \pi_j^h(p_j)\right), \quad (1)$$

where the vector \mathbf{p} comprises consumer prices for all goods. In this equation household income comprises profits from the production of goods j , $\pi_j^h(p_j)$, and exogenous income, x_0^h . We purposefully leave labor income, transfers and other sources of income (i.e., capital income) out for the moment.

Let us consider now the impacts of changes in the price of commodity i . The short-run impacts

on the household can be derived by differentiating the indirect utility function. This delivers:

$$\frac{\partial V^h}{\partial p_i} = \frac{\partial V^h}{\partial p_i} + \frac{\partial V^h}{\partial y^h} \frac{\partial \pi_i^h}{\partial p_i}. \quad (2)$$

Next, recall first that Roy's identity indicates that the consumption of good i , c_i^h is given by:

$$c_i^h = - \frac{\partial V^h / \partial p_i}{\partial V^h / \partial y^h}. \quad (3)$$

Second, recall also that Hotelling Lemma established that household production q_i^h is given by

$$\frac{\partial \pi_i^h}{\partial p_i} = q_i^h. \quad (4)$$

In consequence, we get

$$\frac{\partial V^h}{\partial p_i} = \frac{\partial V^h}{\partial y^h} (q_i^h - c_i^h) \quad (5)$$

Leaving aside, for the moment, the factor $\frac{\partial V^h}{\partial y^h}$, this equation shows that the welfare impact of a price change depends on the difference between the production and the consumption level of the household. Before discussing the implications of this result, note that, in empirical work, we seldom observe quantities consumed and produced. Instead, we observe total expenditures in various goods and services and total income from various production activities. In order to be able to take the framework to the data, we need some manipulation. In short, multiply and divide by p_i and by total household income y^h to get

$$\frac{\partial V^h}{\partial \ln p_i} = \frac{\partial V^h}{\partial \ln y^h} (\phi_i^h - s_i^h). \quad (6)$$

The left-hand side is the object we are trying to measure. On the right-hand side, $\frac{\partial V^h}{\partial \ln y^h}$ is the marginal utility of money to individual h ; ϕ_i^h is the share of household income derived the production of good i , and s_i^h is the budget share spent in good i . In Deaton (1989, 1997), the quantity $\phi_i^h - s_i^h$ is the net benefit ratios which, for policy, is what we care about. In fact, $\phi_i^h - s_i^h$ is the the money equivalent of the losses or gains for different households. Note that $\frac{\partial V^h}{\partial \ln y^h}$ is the private marginal utility of income and we are not concern about this. Instead, we care about the social marginal utility of money. This summarizes the attitudes of the policymaker towards giving resources to household h .

We can now turn to the interpretation of this equation. Households are affected both on the consumption and on the income sides. On the consumption side, consumers are worse off if prices go up but are better off if prices go down. In a first order approximation, these impacts can be measured with budget shares, s_i . On the income side, there is also a direct impact on profits, if the household produces goods i , which depends on the share of income attributed to these goods, ϕ_i . In rural economies, this source of income can account for a large fraction of total income. In more urbanized economies with more developed labor markets (as in many places in Latin America), the role of the direct production of (agricultural) goods will be much less important. Our welfare evaluation will take into account urban households in upper-middle income Latin American countries and therefore from now on we will treat ϕ_i^h as zero for all households.

In a small open economy that faces exogenous commodity prices (determined in international markets), wages will respond to changes in those prices mainly because the demand for labor depends on prices (labor supply can be affected by prices as well, but we defer this discussion for the moment). Changes in relative product prices cause some sectors to expand and some others to contract. If sectors use factors of production in different proportions, then the relative demand for factors (including skilled labor, unskilled labor, capital) will change. Even with fixed labor supply, wages will adjust. If labor supply reacts as well, an additional channel emerges. In practice, the link between wages and prices depends on the way product prices affect factor demands and supplies and in the way changes in factor demands and supplies transmit to wages. It is possible to imagine situations where wages would not react to a change in a given price, or situations where wages would increase, or decrease. The prices of non-traded goods can also be affected. In the simplest mechanisms, a change in the price of a traded good affects factor prices, as discussed above, and this, in turn, affects the cost of production of non-traded goods. As a result, the prices of these goods may change as well. How these prices, including wages, respond to trade policy is an empirical question.

It is relatively simple to amend the theoretical framework to account for these responses. We begin with wage adjustments. To illustrate them, we work with the expenditure function approach, as in Dixit and Norman (1980). As before, the unit of analysis is the household, denoted by h . In equilibrium, household expenditures (including savings) have to be financed with household income (including transfers).

$$e^h(\mathbf{p}, u^h, \mathbf{x}^h) = \sum_j w^j + \sum_i \pi_i^h(\mathbf{p}, \psi) + T^h + x_0^h. \quad (7)$$

The expenditure function $e(\cdot)$ of household h , on the left hand side, is defined as the minimum expenditure needed to achieve a given level of household utility u^h . It depends on a vector of prices of consumption goods, \mathbf{p} , on the level of utility u^h , and on other household characteristics, \mathbf{x}^h (such as household composition).

Income comprises the sum of the wages of all working members j (w^j) and the sum of the profits π_i made in different economic activities i . Profits include, for instance, the net income

from agricultural production or farm enterprises. They depend on prices, technical change and key household characteristics (summarized by ψ). Notice that profits are defined as sales net of purchases of inputs so that some of the effects caused by protection on inputs or intermediate goods can be captured by π_i . In (7), T^h measures transfers (public or private), saving and other unmeasured factor returns. Finally, we add exogenous income x_0^h for technical reasons.

It is evident from equation (7) that household welfare depends on equilibrium variables such as prices and wages (that affect household choices) and also on household endowments. For instance, household consumption depends on the prices of consumer goods and household income depends on the labor endowment (skilled, unskilled), the wage rate, and the prices of key outputs. It follows that changes in commodity prices affect welfare directly via consumption and production decisions, and that these impacts are heterogeneous insofar as they depend on household choices and endowments. In addition, there are short-run impacts, when households do not adjust, medium-run impacts, when households make partial adjustments, and long-run impacts, when growth, investments, and long-run choices have taken place.

The first order impact of changes in the price of good i can be derived by differentiating equation (7) (while keeping utility constant and adjusting x^h). It follows that

$$cv^h = \left(\phi_i^h - s_i^h \right) d \ln p_i^h + \sum_j \theta^j \varepsilon w_i^j d \ln p_i^h, \quad (8)$$

where $cv = -dx_0/e$ is a measure of the compensating variation (as a share of initial expenditures) associated with a change in the i th price. The compensating variation is the revenue of a planner that needs to compensate households for the price change. If a household loses from a price increase, the compensating transfer of income from the planner is dx_0/e and the compensating variation cv is negative (i.e., a deficit for the planner). Instead, if the household benefits from a price increase, the compensating variation is positive because it actually represents a transfer from the household to the planner (so that dx_0/e is negative).

In (8), s_i is the budget share spent in good i , ϕ_i is the share of household income from the production of good i (assumed zero in our empirical framework), θ^j is the share of the wage income of member j in total household income, and εw_i^j is the elasticity of the wage earned by household member j with respect to the price p_i .

Equation (8) summarizes the first-order impacts of a price change. The first term on the right hand sides re-established the net-consumer/net-producer result, as before. Now, price changes also affect wages. This channel is described by the second term on the right hand side of (8). The mechanisms are in principle simple. When there is a price change, labor demand for different types of labor (and also labor supply) can change, thus affecting equilibrium wages. In (8), these responses are captured by the elasticities εw_i^j , which will vary from one household member to another provided different members are endowed with different skills (unskilled, semi-skilled or skilled labor) or if they work in different sector (industry premia). These impacts on labor income depend on the share of income contributed by the wages of different members, θ^j . Clearly, if countries differ in technologies, endowments, or labor regulations, the responses of equilibrium

wages to prices can be heterogeneous across different economies.

In the presence of wage adjustments, the standard net-consumer/net-producer proposition needs to be modified. To see this, consider the case where a household consumes a product but does not produce it at all. Instead, the household earns income from selling labor. Omitting wages, this household is a net consumer and could thus be hurt by a price increase. But if wages respond positively to prices, the final welfare effect may not necessarily entail a loss. The total welfare effect will come from the evaluation of:

$$cv^h = \left(-s_i^h\right) d \ln p_i^h + \sum_j \theta^j \varepsilon w_i^j d \ln p_i^h, \quad (9)$$

3.3 Data

3.3.1 GTAP and Protection data

The MIRAGE model is calibrated on the GTAP dataset version 7 release 1, with 2004 as base year. Our data aggregation isolates key sectors for Latin American countries (e.g. Meat, Cars) which also match with goods disaggregation from households surveys.

For the regional aggregation, we retain the main developed regions (e.g. the EU and NAFTA) and large Latin American countries (e.g. Brazil and Argentina). The rest of the world is aggregated according to their trade relationship with the Latin American region (e.g. Cairns group and Central America and Caraiibe) such as is shown in Table 3.

Tariffs affecting goods are also taken from GTAP which uses the Market Access Maps (MAcMap-HS6) dataset version 2 in its last update version. The *ad-valorem* equivalent (AVE) tariffs have been aggregated at the GTAP level using the reference group weighting scheme developed for MAcMap (Bouët et al., 2008). Tariff equivalents of regulatory barriers to trade in services are calibrated using recent estimates from Fontagné et al. (2011).

Data to calibrate NTB in goods is based on Kee et al. (2008) estimates at the HS6 level, which are aggregated up to the GTAP level using a trade weighting scheme. NTB in service sectors are calibrated using estimates from a simple gravity model. Trade costs associated to time (i.e. customs procedures, time at the port, transportation, etc) have been calibrated using a database provided by Minor and Tsigas (2008) which follows the methodology from Hummels and Schaur (2012). Minor and Tsigas (2008) provide a measure of the daily cost of time as a percentage of the value of the good. Detailed data is then aggregated at the GTAP level following a trade weighted scheme.

3.3.2 Household Data

This paper attempts to measure the welfare impact of alternative scenarios of trade protectionism and liberalization in four large Latin American countries, namely Argentina, Brazil, Colombia, and Peru. The impact of the different trade policies is assessed in two different ways. The first

one is with the output from the Mirage model that provides the effect of trade policy on GDP, exports, imports, terms of trade, real wages, and welfare. The second approach is to follow the trade and poverty literature and use the price and factor remuneration changes from each simulation to feed them into household survey data and assess the welfare effect on households.

Argentina We use two sources of data for Argentina, the household expenditure (ENGH) survey and the permanent household survey (EPH). The National Household Expenditure Survey (ENGH) contains data on consumption at the household level. In Argentina, the consumption classification involves nine groups of goods. These nine groups are Food and Beverages, Clothing, Housing, House Equipment, Entertainment, Education, Health, Transport and Communication, Other Goods and Services. The National Institute of Statistics and Censuses (INDEC) constructs price indexes for these consumption goods. The ENGH Survey, conducted from March 1996 to March 1997¹, provides information on household monthly expenditure on over ninety goods. The ENGH is a comprehensive survey that covers over 21,127 households (once outliers are eliminated) across urban areas in Argentina. Some basic features of the data are as follows. The mean household per capita expenditure in Argentina during 1996/1997 was 251.2 dollars per month, with a standard error of 246 dollars. Argentine households spent, on average, 47% of their budget on Food and Beverages. Housing, Transport and Communication accounted for 20.9% of the budget while Other Traded Goods accounted for another 8.5%. 7.8% of the average budget went to Clothing, 6.3% was spent on Health and Education and 5.7% was spent on Leisure Goods. Finally, 3.7% of total household expenditure was allocated to House Equipment and Maintenance Goods. The second source of data for Argentina is the permanent household survey, Encuesta Permanente de Hogares, or EPH. These surveys are collected in May and October in each year and are the main source of labor market information in the country. In this paper we use the October 2004 survey. The key insight of the empirical methodology is to use the wage data in the EPHs with the consumption budget share of the different categories of goods from the ENGH, combined with price and wage changes in each of the simulation in the model to estimate total household welfare in Argentina.

Brazil, Colombia and Peru For these three countries we do not have detailed household expenditure data. The households' survey data provides information on demographics, education, employment, and income sources. Given that our simulations provide the effects of trade policies on real wages for skilled and unskilled labor we can use the household data to estimate the welfare effect on the household as a wage earner. In the case of Brazil we use the survey "Pesquisa Nacional por Amostra de Domicilios" (PNAD) collected by the "Instituto Brasileiro de Geografia e Estatística", for Colombia we use "Encuesta Continua de Hogares" (ECH) collected by the "Departamento Administrativo Nacional de Estadística" and for Peru we use the "Encuesta Nacional de Hogares" (ENAHO) collected by the "Instituto Nacional de Estadística e Informática". As in the case of the EPH in Argentina, we use the surveys corresponding to 2004.

¹INDEC conducted a new expenditure survey in 2004/2005 but the results of this survey are not publicly available.

3.4 Simulation scenarios

The MIRAGE Model calibration data describes the 2004 economy. However, it is known how the world economy has behaved over the period 2004-2010 and we have introduced those changes by running a pre-experiment in our reference baseline. Those changes concern the end of the Multi-Fiber Agreement in 2005, bounds on export subsidies for non LDC countries, and reduction in factor subsidies and agricultural production taxes/subsidies in the EU following the last changes in the CAP. In 2012-2013 each of the scenarios described below is implemented. The reference situation over the whole period is defined by the trajectory of the world economy up to 2013 forecast by the International Monetary Fund (IMF), and from 2013 onwards as forecast by CEPII using a three-factor (labor, capital, energy) growth model (Fouré et al., 2010).

Even if the MIRAGE model allows long-run economy trend and simulation results, we will only focus on short-run effect of the following trade policy scenarios.

We have run many alternative scenarios of protectionism and liberalization that mainly concern Latin American economies. Scenarios based on protectionism hypothesis are nowadays the most relevant to discuss given the present trade policy decisions that have been taken in most Latin American countries. However, other liberalization scenarios appear as an alternative option to think of under the present international context. Thus, we will compare both protectionism and liberalization scenarios under different assumptions of unilateral, bilateral, regional and multilateral changes in trade policy that may concern the four chosen Latin American countries, namely Argentina, Brazil, Colombia and Peru.

Starting with protectionism scenarios we built four different options to Latin American countries. The first scenario concerns the increase in trade protection as a unilateral decision of each of our four Latin American countries. This scenario has been run under three different modalities: the first one assumes an increase of present applied tariffs to the bound duties at the WTO (i.e. 35% in Argentina, Brazil and Colombia and 30% in Peru); the second modality adds an increase in NTBs, and the last one also includes a rise in other trade costs linked to time. Concerning regional protectionism, we have run two scenarios, one only concerning the increase in the Common External Tariff from Mercosur and the other simulates the increase in NTBs and trade costs in all Latin American countries. The fourth and last scenario of this first set of simulations concerns the back to protectionism in the multilateral level, which could be view as the present world trend or even as the possibility of retaliation of the rest of the world to the protectionism decisions in Latin America.

1. **Unilateral Protectionism:** Argentina, Brazil, Colombia and Peru increase unilaterally their trade protection. This scenario is run under the three different modalities described above.
2. **Back to Bound tariffs in Mercosur:** Common External Tariff in the four Mercosur countries are set at 35%, which is the bound tariff at the WTO, according to next Argentinean proposal. No changes in NTBs nor in other transaction costs have been implemented.

3. **A closer Latin America:** intensification in NTBs in Latin American countries (100% increase in *ad valorem* equivalent protection) and transaction costs linked to time (e.g. administrative restrictions).
4. **A More Protected World:** every country in the World increases its NTBs and administrative controls (transaction costs) doubling them.

These will be the main protectionism scenarios that we will discuss in the paper and we will compare them to the alternative liberalization scenarios that we present below. Each liberalization scenario will be also run assuming different modalities of liberalization: modality (a) assumes only tariff elimination, modality (b) also reduces (in a half) NTBs and finally, modality (c) adds the reduction of other transaction costs linked to time.

5. **Unilateral liberalization:** this scenario only concerns unilateral liberalization decision from each of our main Latin American countries (Argentina, Brazil, Colombia and Peru). Its has been run assuming the three different modalities described above. This scenario is the less interesting and unrealistic one but it could be useful to isolate and understand some effects.
6. **Bilateral Free Trade Agreements with China:** we assume than according to present negotiations and the intensification of the bilateral trade relation between Latin America and China, each of the four chosen countries signs and implements an FTA with this Asian country. This scenario is also run under the three modalities.
7. **Latin America Integration:** this scenario assumes an FTA between Latin American countries following trade strategies of governments in the region. This scenario is also simulated under the three modalities.
8. **Full Liberalization:** this scenario assumes that the present Doha Development Agenda (DDA) negotiations come back again to the center of discussion. Hence, we simulate a full trade liberalization at the world level, also assuming the three modalities to identify the implications of each instrument of protection.

4 Trade Policy: Simulation Results

4.1 Argentina

4.1.1 (Unilateral)Protectionism: only Short-run Gains

In this subsection we will discuss different protectionist scenarios in Argentina. All scenarios seem quite realistic due to the present protectionism trend in the Latin American region; however, they remain quite general and do not take into account current FTA with the region other trade partners but they do not violate WTO commitments. This is particularly the case of a unilateral protection scenario where all tariffs are increased to the tariff levels consolidated at

the WTO (CTS). Moreover, other modalities for this scenario also take into account the increase in other types of protection such as no-automatic licenses and other administrative restrictions (NTBs and transaction costs).

Table 4: Argentina - Protectionism

	Unilateral increase			Mercosur Increase (a)	Latin America Increase (d)	World Increase (d)
	(a)	(b)	(c)			
GDP (vol)	5.14	6.37	7.11	4.58	0.34	-3.61
Exports (vol - no intra)	-30.95	-40.80	-44.82	-19.43	-27.97	-39.14
Imports (vol - no intra)	-36.62	-55.27	-62.14	-21.40	-42.45	-46.93
Terms of trade	7.80	-2.83	-7.34	4.38	-10.32	0.07
Skilled real wages	0.89	0.00	-0.28	0.76	-1.68	-1.87
Unskilled real wages	-1.59	-1.95	-2.10	-1.40	-1.34	-2.21
Welfare	1.30	-0.32	-0.85	0.89	-2.27	-2.66
Welfare Decomposition						
<i>Allocation efficiency gains</i>	-0.98	-1.75	-2.09	-0.78	0.00	0.00
<i>Capital accumulation gains</i>	-0.02	-0.19	-0.24	0.01	-0.29	-0.31
<i>Land supply gains</i>	-0.19	-0.26	-0.29	-0.16	-0.12	-0.18
<i>Other gains</i>	1.25	1.85	2.26	0.97	0.24	-0.03
<i>Terms of trade gains</i>	0.75	-0.63	-1.25	0.49	-1.23	1.34
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	-1.25	-4.01
<i>Variety gains</i>	0.48	0.66	0.76	0.35	0.38	0.53

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs
- (d) NTB + Facilitation Costs

Assuming that Argentina intensifies unilaterally their import restrictions (see Table 4, column 1), macroeconomic effects can differ across the modalities implemented. Only a tariff increase to the CTS level (i.e. 35% for this country) improves national welfare, which is basically explained by terms of trade gains. Nevertheless, becoming a closer economy distorts the use of resources leading to important losses in terms of allocative efficiency. At the same time and in the short term, GDP increases but this increase in the value added does not fully compensate changes in local prices and thus welfare increases in a lower proportion. It is expected that in the long run, GDP will decrease because of the limitation to buy capital goods (i.e. fall in investment). Moreover, the increase in the level of duties reduces total imports in Argentina such as it was expected and since this model's external closure assumes a constant current account balance, exports also decrease and the real exchange rate appreciates (i.e. 9.12%). As expected, production and trade impacts at the sectoral level show that relative protection is harder over manufactured sectors, such as electronic and transport equipment, than on the most traditional one in Argentina (i.e. oilseeds, rice or meat). This distortion leads to lower increases and even some falls in the level of agricultural production due to reallocation of production factors to industrial sectors. Real returns for the owner of production factors mainly decrease, except for skilled labor which is mostly employed in industrial sectors and whose real wages increase almost 1%. The rest of factors (unskilled labor, capital, land and natural resources) are negatively affected in their purchasing power.

In the case of increasing Argentina import protection through more restrictive non-tariff barriers (see Table 4, column 2), national welfare deteriorates particularly because of the loss in the terms of trade and the intensification of other welfare losses (i.e. losses on allocative efficiency, capital

accumulation, and land supply). Welfare gains in terms of a greater number of national varieties in sectors under imperfect competition conditions (i.e. chemicals, machinery, electronic devices) do not compensate most traditional welfare losses. Even with welfare falls, value added increases in Argentina; however, this greater GDP (in volume) is not enough anymore to buy the same goods such as before because of prices increase, so that is why welfare decreases while GDP increases. Moreover, this welfare loss at the national level reflects that non of the production factors benefits from a purchasing power improvement. Real returns of all factor decrease, affecting mostly the owner of natural resources, land and also the wage of unskilled workers. Argentinean export and imports also decrease while the real exchange rate suffers a greater appreciation (13.69%).

Now if we add greater transaction costs linked to time over Argentinean imports (see Table 4, column 3), macroeconomic results go in the same direction than the previous modality and they also intensify. Given that in this model NTBs are modeled as part of trade costs, we would think that both scenarios are equivalent; however, the previous one only increases NTBs where they exists before, that is, the increase in transaction costs is heterogeneous across partners and products. For instance, Argentine displays greater NTBs on industrial Chinese exports but not on dairy products from the most developed countries in the Cairns group. Thus, differentiation this scenario from the previous one, it increases trade costs in an homogeneous way all over trade partners and goods. Aggregate results do not display these subtilities and only show a greater welfare loss and all the related results that go in the same direction as before.

Other protectionist scenario that Argentina could implement is as Mercosur member (see Table 4, column 4). Under this scenario we assume that all Mercosur countries increase their tariffs at the CTS level declared at the WTO. This scenario could be associated to the first one but as a regional protection decision and not as a unilateral measure. Even if in this scenario welfare increases in Argentina, the terms of trade gains are smaller compared to the unilateral protection scenario. The reason is that Argentina keeps the intra-Mercosur tariffs unchanged. Changes in real wages are also smaller but always benefiting skilled labors and deteriorating the purchasing power for unskilled workers. Appreciation of the real exchange rate is less important (-3.44%) and Argentinean trade is thus less altered.

Table 5: Argentina - Protectionism and Prices

Product Categories	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
Food and Beverages	9.40	13.97	16.22	8.39	4.61	-0.18
Clothing	11.44	18.52	21.39	9.38	8.44	4.17
House Equipment	18.08	27.62	31.94	14.88	13.87	10.52
Others	9.05	13.83	16.00	8.53	4.20	0.24
Transport and Communication	11.72	17.07	19.39	10.41	5.24	1.34
Health and Education	10.27	15.17	17.47	9.34	4.17	-0.27
Leisure goods	10.56	15.43	17.69	9.57	4.03	-0.49

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs
- (d) NTB + Facilitation Costs

Finally, we consider the case of an increase in protectionism in Latin American region (Column

5 in Table 4) and at the world level (column 6 from Table 4). Due to the different countries' commitments at the WTO, we decided to evaluate an scenario with increase in only NTBs and other trade costs linked to time, such as administrative restrictions in customs. If all Latin American countries decide to follow the present trend in large countries from the region, which could be considered as a retaliation reaction, the consequence would be an important loss in welfare for Argentina. Welfare results could be even worst if the same reaction is taken at a multilateral level. None of these scenarios are desirable for this economy and the world.

In short, we can say that among all protectionist scenarios, the unilateral decision is the best one for Argentina in terms of welfare benefits in the short run. However, we have to keep in mind that this kind of policies could reduce investment in the long run and even be the cause of further similar reactions (retaliation) leading Argentina to a worst situation such as under a multilateral protectionism.

4.1.2 Liberalization: Leading a Latin America Integration

Looking to trade liberalization scenarios, a unilateral market access improvement in Argentina shows the opposite results to the unilateral protection scenario. Eliminating tariffs (column 1, Table 6) reduces welfare through the deterioration of the terms of trade and some national varieties are lost due to the increase in competition. However, the elimination of this distortions in the market improve efficiency in terms of the resources allocation. This liberalization scenario improves real returns to all factors, except for skilled labor whose real wage are slightly reduced (-0.07%). Total Argentinean trade flows increase under this scenario and the real exchange rate depreciates (4.38%). Moreover, introducing the elimination of NTBs and improving trade facilitation conditions (columns 2 and 3 from Table 6) lead to important welfare improvements in this economy (terms of trade gains) and also to increase purchasing power for all production factors, even to skilled workers.

A more interesting scenario for this country is the FTA with China (columns 4, 6 and 7 from Table 6). Welfare and GDP both increase and almost all production factors improve their real returns. This FTA with China, not only improve Argentinean trade but also a greater facilitation to access to the Chinese market lead to Argentina to gain in terms of trade costs.

The Latin America Integration appears as the best scenario for this country (columns 8, 9 and 10 from Table 6), even over a multilateral liberalization scenario (columns 11, 12 and 13 from Table 6). In the case of Latin America integration, the elimination of tariff do not introduce large trade and welfare gains in the case of Argentine. This is due to the the preexistent trade agreement in the region. However, greater improvements could be done in terms of trade facilitation and reducing other non trade barriers between Latin American countries. For all modalities of the Latin America integration scenario, Argentinean welfare increase and all production factors improve their real returns. There are also some important allocative and terms of trade gains, and particularly when trade facilitation is introduced, this country increases its trade-costs gains as exporter to the region.

Finally, the multilateral full trade liberalization scenario is a second choice for this country after the Latin America Integration. Tariffs cuts in a multilateral way only reduces Argentinean

Table 6: Argentina - Liberalization scenarios

	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
GDP (vol)	-0.72	-4.20	-6.68	0.08	11.34	10.93	0.19	9.92	16.07	-0.18	4.67	5.54
Exports (vol)	7.58	33.74	52.17	1.89	37.52	43.96	0.92	51.79	99.54	8.02	41.55	54.92
Imports (vol)	8.71	75.68	129.89	2.90	40.59	54.86	1.90	68.65	143.17	10.94	46.28	66.39
Terms of trade	-1.33	20.71	34.59	0.15	-5.59	-1.88	0.37	0.09	4.13	-0.50	-3.39	-1.07
Skilled real wages	-0.07	4.01	7.47	-0.04	1.05	1.68	0.04	4.03	8.92	-0.34	1.73	3.05
Unskilled real wages	0.33	3.74	7.11	0.10	1.27	1.88	0.08	3.89	8.18	0.50	3.38	4.57
Welfare	-0.43	3.24	6.20	0.05	3.20	3.89	0.10	3.94	7.76	-0.23	1.70	2.75
Welfare Decomposition												
<i>Allocation efficiency gains</i>	0.16	0.75	1.07	0.05	0.47	0.80	0.01	0.12	0.24	0.19	0.44	0.55
<i>Capital accumulation gains</i>	0.01	0.46	0.75	0.01	0.25	0.33	0.01	0.40	0.72	0.03	0.25	0.36
<i>Land supply gains</i>	0.05	0.14	0.18	0.02	0.30	0.33	0.01	0.00	-0.06	0.13	0.27	0.29
<i>Other gains</i>	-0.34	-2.07	-3.04	-0.03	-0.71	-1.53	0.02	0.27	0.07	-0.29	-0.47	-0.61
<i>Terms of trade gains</i>	-0.20	4.25	7.67	0.03	-3.02	-2.19	0.06	-1.78	-1.93	-0.06	-1.68	-1.44
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	6.16	6.45	0.00	5.08	8.91	0.00	3.38	4.18
<i>Variety gains</i>	-0.12	-0.29	-0.42	-0.03	-0.25	-0.31	-0.02	-0.15	-0.19	-0.21	-0.49	-0.59

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs

welfare. But intensifying liberalization through the reduction of non trade barriers and facilitating trade conditions, could under this scenario be welfare-improving for Argentina with a particularly positive effect for unskilled workers.

Table 7: Argentina - Liberalization and Prices

Product Categories	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Food and Beverages	-1.80	-6.26	-8.00	0.18	5.89	5.78	0.51	6.68	9.98	0.77	2.45	2.07
Clothing	-4.03	-17.43	-26.00	-0.30	-1.72	-3.92	0.27	-3.30	-10.92	-3.00	-7.73	-10.83
House Equipment	-4.42	-20.58	-28.31	-0.93	-5.04	-9.12	0.15	-3.94	-8.93	-3.42	-10.02	-13.85
Others	-1.60	-4.95	-5.13	0.08	7.25	7.10	0.47	7.78	13.13	-0.14	0.97	1.06
Transport and Communication	-1.76	-6.42	-7.84	0.06	6.16	5.87	0.39	4.39	6.94	-0.45	-0.19	-0.59
Health and Education	-1.72	-3.59	-3.09	0.06	6.25	6.36	0.43	9.27	16.34	-0.36	2.27	2.72
Leisure goods	-1.61	-3.43	-2.39	0.10	6.34	6.48	0.43	8.61	15.72	-0.23	2.62	3.18

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs

Any liberalization scenario that only concerns tariff cuts remains less preferable to a unilateral protectionism in the short term. The latter only can be overcome by a liberalization scenario by reducing NTBs and improving trade facilitation. In that sense, a Latin America integration appears as the most preferable scenario in term of welfare gains for Argentina.

4.2 Brazil

4.2.1 Protectionism: only as a Common Mercosur Strategy

In the case of Brazil, a unilateral protection decision is not as beneficial as for Argentina as welfare gains are smaller. Basically, terms of trade and variety gains are smaller while the protection increase is less distorting in terms of allocative efficiency. Differences in the patterns of trade in Argentina and Brazil and their initial protection (i.e. higher for manufactured imports in Brazil than in Argentina on average) are the main reasons behind the different welfare effect under the same scenario.

Table 8: Brazil - Protectionism

	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
GDP (vol)	4.17	5.55	5.98	4.34	0.83	-3.26
Exports (vol – no intra)	-34.16	-46.98	-49.49	-29.32	-30.55	-44.05
Imports (vol – no intra)	-40.83	-63.53	-67.45	-33.77	-46.52	-53.96
Terms of trade	8.02	-4.75	-7.25	7.34	-11.34	-0.32
Skilled real wages	-0.08	-1.92	-2.24	0.16	-2.63	-2.90
Unskilled real wages	-2.17	-3.53	-3.73	-1.71	-2.47	-3.02
Welfare	0.40	-1.14	-1.40	0.53	-1.99	-2.39
Welfare Decomposition						
<i>Allocation efficiency gains</i>	-0.91	-1.74	-1.91	-0.85	0.00	0.00
<i>Capital accumulation gains</i>	0.03	-0.11	-0.13	0.02	-0.17	-0.19
<i>Land supply gains</i>	-0.05	-0.07	-0.08	-0.05	-0.03	-0.05
<i>Other gains</i>	0.34	0.92	1.09	0.45	-0.32	-0.43
<i>Terms of trade gains</i>	0.67	-0.60	-0.87	0.66	-1.18	0.91
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	-0.54	-3.02
<i>Variety gains</i>	0.32	0.46	0.50	0.30	0.26	0.39

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs
- (d) NTB + Facilitation Costs

Like in the case of Argentina, increasing protection through NTBs and time trade costs makes that all potential welfare gains disappear. The only production factor that improves its real returns are the owner of natural resources (i.e. mainly used in the production of energy products such as fuels), while all kind of labors would see a deterioration in their purchasing power under the three modalities of unilateral protection in Brazil.

Total trade flows in Brazil are also negatively affected by these trade measures and the real exchange rate also appreciates but less than in Argentina to keep the current account balance unchanged.

In contrast to Argentina's results, the increase in the common external tariff in the Mercosur (see Table 8 column 4) appears as the most preferable scenario for Brazil in terms of welfare. That is, a unilateral decision of tariff increase in Brazil, including protection over imports from the other Mercosur members, would not be the best choice. Brazilian market, the characteristics of its import demand from Mercosur products and the close trade relationship with its partners makes that Brazilian welfare gains (terms of trade gains) more sensitive to changes in protection intra Mercosur (i.e. greater costs than benefits from the intra-Mercosur tariff increase to Brazil).

Looking at real returns on labor, this scenario would generate an increase in the real wage of skilled labors while (such as under the unilateral protection scenario) unskilled workers would see their purchasing power deteriorate.

Finally, if the unilateral or Mercosur decision to increase protection is followed by the rest of Latin American countries (Table 8 column 5) or even by the rest of the world (Table 8 column 6), Brazilian welfare would deteriorate, affecting in particular unskilled workers. None of these extreme protectionism scenarios are good news for Brazil neither desirable for the rest of the world.

Table 9: Brazil - Protectionism and Prices

Product Categories	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
Food and Beverages	7.89	12.43	13.54	7.65	4.52	-1.72
Clothing	9.50	15.76	17.28	9.53	6.74	1.64
House Equipment	12.87	24.22	26.33	12.99	13.03	8.64
Others	8.95	14.55	15.84	9.02	5.44	0.62
Transport and Communication	9.73	14.64	15.96	9.87	4.67	-0.27
Health and Education	7.99	11.70	12.74	8.49	2.81	-2.48
Leisure goods	8.92	12.17	13.09	9.44	2.14	-3.08

4.2.2 Liberalization: Gains from Trade Facilitation

Comparing the consequences of the same liberalization strategies between Argentina and Brazil, we also find that a unilateral tariff cut (Table 10 column 1) also deteriorates national welfare. However, greater welfare gains for Brazil could come from the elimination of NTBs (Table 10 column 2) and from the reduction of trade costs (Table 10 column 3) linked to time (transports and customs delays). These complete measures of unilateral liberalization could not only improve welfare in a more efficient way (large gains in allocative efficiency) but also in terms of income distribution. Both type of labor would see an improvement in their real wages. The owners of natural resources would also be particularly benefited in these scenarios. Trade flows between Brazil and the rest of the world would improve and the real exchange rate would depreciate (-8% under modality 3) to keep the external balance unchanged.

We also compare different trade liberalization decisions affecting Brazil, such as an FTA with China (Table 10 columns 4, 5 and 6), following Latin America Integration (Table 10 columns 7, 8 and 9) or going further to a multilateral liberalization (Table 1010, 11 and 12). If the modality of liberalization is restricted to tariffs the best scenario for Brazil is, like in the case of Argentina, the Latin America integration (0.09% for welfare gain). If Brazil is ready to negotiate also the elimination of NTBs and trade facilitation conditions, the best alternative becomes an FTA with China (5% and 6% of welfare gains resp.) Nevertheless, looking at the decomposition of welfare gains, a multilateral trade agreement could bring large gains to Brazil due to terms of trade improvement and a greater allocation efficiency. These qualitative results are not observed under other scenarios. In terms of income distribution and factors' purchasing power, the most complete multilateral liberalization scenario also appears as the best one for unskilled workers.

Whatever the strategy of trade liberalization chosen by Brazil, welfare gains will be larges if NTBs and trade costs reduction are included in negotiations.

Table 10: Brazil - Liberalization scenarios

	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
GDP (vol)	-1.10	-8.50	-13.01	-0.06	13.95	14.56	0.21	2.99	6.18	-0.07	3.55	4.54
Exports (vol)	12.31	98.56	123.02	2.49	115.70	135.65	1.69	60.22	102.34	19.44	76.86	96.63
Imports (vol)	13.77	202.78	278.58	3.27	152.63	186.10	3.04	88.10	144.25	31.65	108.49	134.75
Terms of trade	-2.28	29.47	41.60	-0.17	-1.61	0.60	0.44	4.56	3.72	2.27	3.24	3.23
Skilled real wages	-0.03	7.58	10.81	-0.01	3.34	4.36	0.03	2.77	4.65	-0.59	2.99	3.92
Unskilled real wages	0.24	7.74	10.85	0.04	2.32	3.61	0.02	3.12	5.13	0.01	4.20	5.00
Welfare	-0.59	6.06	9.17	-0.06	5.34	6.34	0.09	2.82	4.70	0.06	3.00	3.80
Welfare Decomposition												
<i>Allocation efficiency gains</i>	0.14	0.98	1.34	0.05	0.69	1.10	0.01	0.12	0.24	0.21	0.58	0.71
<i>Capital accumulation gains</i>	0.01	0.42	0.59	0.01	0.31	0.37	0.01	0.10	0.18	0.06	0.23	0.29
<i>Land supply gains</i>	0.02	0.06	0.08	0.01	0.06	0.06	-0.00	0.00	0.01	0.12	0.18	0.20
<i>Other gains</i>	-0.34	-2.15	-3.86	-0.07	-2.69	-3.51	0.03	-0.55	-1.28	-0.35	-0.20	-0.29
<i>Terms of trade gains</i>	-0.29	7.29	11.70	-0.02	-2.98	-2.50	0.06	0.38	0.12	0.37	0.01	-0.09
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	10.27	11.26	0.00	2.89	5.66	0.00	2.87	3.76
<i>Variety gains</i>	-0.13	-0.53	-0.66	-0.03	-0.33	-0.45	-0.01	-0.14	-0.23	-0.34	-0.68	-0.78

Notes:

- (a) Only Tariffs elimination.
(b) Tariffs and NTBs elimination.
(c) Tariffs + NTBs + Facilitation Costs

Table 11: Brazil - Liberalization and Prices

Product Categories	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Food and Beverages	-2.30	-9.73	-10.92	-0.06	9.92	11.02	0.41	0.71	1.48	4.78	5.06	4.84
Clothing	-4.18	-19.86	-24.38	-0.78	-5.35	-10.88	0.34	-2.18	-6.54	-0.74	-6.00	-8.15
House Equipment	-5.86	-25.64	-30.57	-1.41	-7.73	-10.83	0.25	-0.04	-0.87	-3.70	-12.42	-14.76
Others	-2.22	-10.23	-11.86	-0.22	9.95	10.99	0.55	0.74	0.92	2.60	1.04	0.78
Transport and Communication	-2.64	-7.70	-8.79	-0.22	9.35	10.57	0.45	1.75	1.86	1.60	1.83	1.38
Health and Education	-2.32	-3.32	-2.67	-0.22	10.22	12.04	0.46	3.67	5.33	1.70	4.60	4.83
Leisure goods	-2.10	-2.05	-0.95	-0.20	9.87	11.75	0.44	3.91	5.85	1.67	5.20	5.63

4.3 Colombia

4.3.1 Protectionism: No Welfare-improving Choice

Table 12: Colombia - Protectionism

	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
GDP (vol)	5.23	6.56	7.41	-0.16	0.56	-1.72
Exports (vol – no intra)	-31.05	-42.42	-48.03	-1.79	-31.03	-41.11
Imports (vol – no intra)	-26.40	-45.43	-53.45	-2.46	-39.06	-42.09
Terms of trade	6.81	-5.13	-10.32	-0.66	-11.57	-0.91
Skilled real wages	0.64	-1.48	-2.25	-0.11	-3.59	-4.08
Unskilled real wages	-1.09	-2.08	-2.42	-0.12	-2.30	-3.48
Welfare	0.85	-1.30	-2.19	-0.15	-3.25	-3.37
Welfare Decomposition						
<i>Allocation efficiency gains</i>	-0.74	-1.56	-1.99	0.00	0.00	0.00
<i>Capital accumulation gains</i>	-0.07	-0.34	-0.46	-0.01	-0.45	-0.45
<i>Land supply gains</i>	-0.06	-0.08	-0.10	-0.01	-0.02	-0.08
<i>Other gains</i>	0.62	1.07	1.33	-0.06	-0.27	-0.56
<i>Terms of trade gains</i>	0.88	-0.67	-1.34	-0.11	-1.78	-0.04
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	-0.90	-2.54
<i>Variety gains</i>	0.23	0.29	0.37	0.03	0.16	0.30

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs
- (d) NTB + Facilitation Costs

Coming back to protectionism does not appear as a welfare-improving scenario for Colombia. Only a unilateral decision to increase tariffs (Table 12 column 1) could improve its terms of trade and thus slightly increase welfare in this country. Moreover, under this scenario only skilled labors increase their purchasing power while the rest of productive factors would observe a deterioration in their real returns.

Table 13: Colombia - Protectionism and Prices

Product Categories	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
Food and Beverages	10.20	17.76	21.25	-0.14	7.88	5.24
Clothing	12.78	21.44	26.35	0.21	11.22	8.75
House Equipment	19.98	37.83	44.17	0.09	22.53	21.44
Others	8.82	14.16	17.51	-0.13	5.33	3.75
Transport and Communication	10.46	15.46	18.88	-0.18	5.14	3.96
Health and Education	10.10	15.19	18.46	-0.18	4.45	1.73
Leisure goods	11.17	15.65	18.35	-0.27	3.22	0.17

Colombian imports and exports are negatively affected by any protectionist decision and the real exchange rate appreciates to keep constant the external balance (e.g. 9.23% of real appreciation with a unilateral increase of duties).

4.3.2 Liberalization: Going further to the Latin America Integration

Like in the case of Argentina, among all trade liberalization scenarios a Latin America integration (Table 14 columns 7, 8 and 9) seems to be the better alternative, especially if negotiations

are restricted to consider only on tariff cuts (i.e. welfare improves 0.5% under the regional integration only with tariff elimination while a multilateral tariff cut only increases its welfare in a half). Welfare gains are even larger if NTBs and facilitation costs are part of the liberalization agreement. A unilateral liberalization (Table 14 columns 1, 2 and 3) and an FTA with China (Table 14 columns 4, 5 and 6) only could be a welfare-improving scenario if NTBs and trade costs are also reduced.

Table 14: Colombia - Liberalization scenarios

	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
GDP (vol)	-1.56	-5.20	-8.94	-0.17	-1.22	0.83	1.14	12.67	19.72	-0.11	1.94	5.05
Exports (vol)	16.75	52.56	86.88	1.95	12.11	32.21	14.62	102.57	191.97	24.73	61.59	93.47
Imports (vol)	13.49	84.71	158.62	1.63	17.82	41.74	16.46	103.65	204.90	25.13	56.81	90.07
Terms of trade	-2.81	21.02	38.30	-0.31	5.08	7.17	1.58	0.45	4.32	0.08	-3.49	-2.35
Skilled real wages	0.18	6.68	12.10	-0.06	0.47	1.44	0.96	6.86	13.18	0.42	3.96	6.39
Unskilled real wages	0.57	5.35	10.42	-0.05	0.33	0.52	1.23	5.45	11.83	1.55	5.43	7.97
Welfare	-0.56	4.36	8.73	-0.09	0.36	1.80	0.49	4.92	9.80	0.26	2.24	4.40
Welfare Decomposition												
<i>Allocation efficiency gains</i>	0.26	1.51	2.57	0.06	0.60	1.04	0.20	1.40	3.11	0.37	0.80	1.17
<i>Capital accumulation gains</i>	0.05	0.64	1.18	0.00	0.13	0.33	0.08	0.46	0.95	0.13	0.36	0.62
<i>Land supply gains</i>	0.01	-0.05	-0.03	0.01	0.02	0.01	-0.03	-0.22	-0.28	0.25	0.31	0.39
<i>Other gains</i>	-0.29	-2.28	-4.61	-0.10	-1.39	-3.05	-0.04	-2.72	-6.47	-0.36	-0.32	-0.51
<i>Terms of trade gains</i>	-0.50	4.54	9.60	-0.05	0.95	1.52	0.27	-0.92	0.53	0.02	-0.66	-0.44
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	0.11	2.00	0.00	6.92	11.90	0.00	2.00	3.48
<i>Variety gains</i>	-0.08	0.01	0.03	-0.01	-0.05	-0.05	0.01	-0.00	0.07	-0.14	-0.26	-0.31

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs

Looking at real returns to production factors, almost all liberalization scenarios (except a bilateral tariff elimination with China) lead to real wages increase for both skilled and unskilled workers. However, by comparing the different modalities of scenario simulations, purchasing power for skilled and unskilled workers increase more when all kind of trade restrictions are cut off.

Summing up the results, we could see that Colombian international trade strategy should focus around trade liberalization. Moreover, a Latin American integration seems to be the better one in terms of national welfare improvement and also its distribution among factors. In short, the Colombian strategy could be in a line with Argentinean's if the country decides to liberalize further.

Table 15: Colombia - Liberalization and Prices

Product Categories	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Food and Beverages	-4.85	-17.12	-19.21	-0.41	-1.82	-0.60	1.43	-0.55	2.91	0.14	-3.81	-1.98
Clothing	-7.86	-19.02	-31.10	-1.46	-6.27	-9.21	-0.68	-0.69	-20.36	-6.21	-12.09	-15.41
House Equipment	-6.38	-29.90	-38.49	-1.09	-9.18	-15.11	-0.02	-6.31	-10.01	-5.31	-16.82	-20.73
Others	-3.25	-7.26	-9.13	-0.44	-1.88	0.19	2.24	11.86	17.49	0.22	-2.21	-0.45
Transport and Communication	-3.54	-7.69	-12.32	-0.37	-2.00	-0.30	1.44	9.31	9.95	-0.71	-3.72	-3.01
Health and Education	-3.43	-6.08	-5.97	-0.50	-1.79	-0.17	2.85	13.47	22.75	0.46	0.74	3.89
Leisure goods	-3.02	-4.53	-2.97	-0.49	-1.65	-0.14	2.68	13.49	23.10	0.85	2.31	5.95

4.4 Peru

4.4.1 Protectionism: Also a Welfare-depressing Strategy

As in the case of Colombia, coming back to protectionism would not be among government's choices in Peru. Except under a unilateral tariff cut (Table 16, column 1), Peru has no chance to improve its terms of trade and neither to increase real returns to its factors.

Table 16: Peru - Protectionism

	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
GDP (vol)	4.81	4.58	4.56	-1.47	-1.39	-5.73
Exports (vol – no intra)	-38.41	-48.44	-53.30	-6.72	-29.56	-39.12
Imports (vol – no intra)	-27.81	-43.06	-49.92	-8.33	-34.36	-39.32
Terms of trade	9.20	-0.26	-4.94	-2.89	-10.53	-2.45
Skilled real wages	-1.50	-5.69	-7.72	-1.24	-7.25	-7.75
Unskilled real wages	-5.28	-8.20	-9.51	-1.49	-6.00	-6.65
Welfare	1.36	-2.15	-3.98	-1.13	-5.78	-6.50
Welfare Decomposition						
<i>Allocation efficiency gains</i>	-1.13	-2.14	-2.69	0.00	0.00	0.00
<i>Capital accumulation gains</i>	-0.00	-0.40	-0.57	-0.11	-0.63	-0.71
<i>Land supply gains</i>	-0.07	-0.10	-0.11	0.00	-0.03	-0.04
<i>Other gains</i>	-0.12	-0.07	-0.13	-0.15	-1.07	-1.26
<i>Terms of trade gains</i>	2.21	-0.11	-1.29	-0.87	-3.39	-1.20
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	-1.04	-3.89
<i>Variety gains</i>	0.47	0.67	0.80	-0.01	0.38	0.59

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs
- (d) NTB + Facilitation Costs

Even if a unilateral tariff cut could be considered as a “good” among all other worse choices, this is not a sustainable trade policy because a unilateral protection decision could trigger similar reactions in the rest of the world falling in the worst of situations.

Table 17: Peru - Protectionism and Prices

Product Categories	Unilateral increase			Mercosur Increase	Latin America Increase	World Increase
	(a)	(b)	(c)	(a)	(d)	(d)
Food and Beverages	10.15	15.33	18.02	-0.88	6.95	2.46
Clothing	11.03	16.36	20.15	-0.24	9.46	4.79
House Equipment	17.96	36.92	44.39	0.45	24.34	21.53
Others	8.52	13.04	15.93	-1.59	3.93	-0.67
Transport and Communication	12.66	15.77	19.80	-0.78	4.60	0.80
Health and Education	7.05	9.40	11.59	-2.06	1.43	-3.08
Leisure goods	6.43	9.02	11.11	-2.18	1.17	-3.44

4.4.2 Liberalization: Latin America Integration and Trade Facilitation the Best Mix

Welfare-improving alternatives to Peru are rather on liberalization scenarios. A unilateral liberalization only could increase Peruvian welfare if NTBs and trade costs are reduced (Table 18 column 3). The same is true in a Latin America Integration scenario (Table 18 column 6),

which could be the better option if all kinds of trade restrictions disappear within this region. That is because Peru has already signed preferential trade agreements (PTAs) with its most important Latin American partners (i.e. the rest of the Andean Community and an FTA with Chile). Nevertheless, with China and in the multilateral arena this country could even increase its terms of trade gains through tariffs cuts (see Table 14 columns 4 and 10). China and Peru have signed an FTA in 2009, which has entered into force in March 2010. Since protection data used to calibrate the model is from 2007, the impact of the Peru-China FTA scenario could be overestimated at the present state.

Table 18: Peru - Liberalization scenarios

	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
GDP (vol)	-0.43	-1.98	-3.82	0.64	3.29	14.34	0.14	20.94	60.35	0.93	8.35	11.87
Exports (vol)	8.27	43.94	69.16	6.70	26.04	73.34	1.28	108.54	264.73	9.64	42.28	63.52
Imports (vol)	5.81	63.48	112.17	7.64	27.94	69.57	1.18	95.59	229.13	11.61	42.65	66.14
Terms of trade	-1.33	18.31	32.65	2.17	4.79	3.96	0.11	0.56	0.06	2.67	1.08	3.26
Skilled real wages	0.68	10.90	19.80	0.16	2.21	6.92	0.05	12.38	23.96	0.55	6.77	10.90
Unskilled real wages	1.07	10.88	19.22	1.08	4.32	10.34	0.21	13.17	24.70	2.77	8.72	12.31
Welfare	-0.24	8.51	15.83	0.85	3.53	8.81	0.06	10.65	23.01	0.96	6.44	9.90
Welfare Decomposition												
<i>Allocation efficiency gains</i>	0.25	0.74	1.25	0.13	0.83	1.77	0.03	0.19	0.43	0.31	0.54	0.76
<i>Capital accumulation gains</i>	0.05	1.07	1.75	0.08	0.39	0.85	0.00	0.87	1.79	0.15	0.71	1.03
<i>Land supply gains</i>	0.01	0.01	0.01	0.03	0.07	-0.00	0.00	-0.10	-0.16	0.12	0.16	0.14
<i>Other gains</i>	-0.02	-0.13	-0.12	0.04	-0.82	-1.09	0.00	1.67	4.27	-0.06	0.77	1.45
<i>Terms of trade gains</i>	-0.43	6.74	12.80	0.65	1.80	1.43	0.03	-0.27	-7.08	0.78	0.94	1.87
<i>Trade-cost gains (exporter)</i>	0.00	0.00	0.00	0.00	1.45	6.05	0.00	8.09	24.18	0.00	3.75	5.12
<i>Variety gains</i>	-0.10	0.09	0.14	-0.09	-0.18	-0.20	-0.01	0.19	-0.40	-0.34	-0.43	-0.45

Notes:

- (a) Only Tariffs elimination.
- (b) Tariffs and NTBs elimination.
- (c) Tariffs + NTBs + Facilitation Costs

Moreover, all these liberalization scenarios could be considered pro-poor options to this country, since unskilled labor real wages increase more than real returns to other production factors.

In short we can say that in the case of Peru trade liberalization decision would be welfare-improving and it will benefit in particular the poor.

Table 19: Peru - Liberalization and Prices

Product Categories	Unilateral reduction			FTA with China			Latin America Integration			Multilateral Liberalization		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Food and Beverages	-1.91	-8.95	-12.98	1.70	5.04	11.66	0.01	3.93	8.42	2.49	2.16	1.87
Clothing	-4.80	-13.81	-23.93	-1.43	-5.70	-8.35	-0.33	-0.02	-10.58	-2.17	-6.37	-10.28
House Equipment	-5.67	-31.39	-41.23	-1.63	-12.74	-20.51	0.02	-9.72	-17.23	-4.67	-16.89	-21.72
Others	-1.15	-1.00	1.39	2.57	6.61	20.49	0.30	21.00	47.52	2.42	4.47	6.81
Transport and Communication	-1.77	-2.12	-3.35	1.50	4.38	11.20	0.21	13.80	22.68	1.12	2.98	3.12
Health and Education	-1.07	3.46	6.96	2.34	6.92	20.80	0.29	25.41	51.17	2.67	7.87	11.05
Leisure goods	-0.96	3.71	8.59	2.62	7.35	22.48	0.32	26.64	56.05	2.97	8.39	12.10

5 Households Welfare Analysis

In this section we estimate, for the four Latin American economies considered in the analysis, the impact on households' welfare generated by the alternative trade policy regimes. In the previous section we identified the prices and factor remuneration changes generated by shocks to our trade model. We simulated four scenarios of increased protectionism (unilateral, Mercosur, Latin America, and World) and four scenarios of increased trade liberalization (unilateral, FTA with China, Latin America, and World). For some of the scenarios we considered different trade instruments: tariffs, non tariff barriers, and trade facilitation costs.

We use the prices and wage changes from section 4 with the household data described in section 3.3.2 and the methodology we presented in 3.2 to carry out a comprehensive welfare analysis at the household level. For Argentina we have both labor market data and households expenditure and therefore we can study the overall welfare effect of trade policy. In the case of Brazil, Colombia, and Peru we only have labor market data and therefore we can only estimate the effect on labor income. However, in these cases, the overall effect can be somehow inferred from the combination of the labor income effect and the price changes presented in the corresponding tables in the previous section.

5.1 Argentina

5.1.1 Protectionism Scenarios

The figure below shows the nonparametric regressions of change in welfare (as percentage of initial income) and income percentiles for the case of an unilateral increase in protectionism in Argentina through higher import tariffs. The graph shows that the overall effect of this policy is a negative income effect between 10% and 12%. The effect is stronger for poor households. The result is a combination of higher prices in all consumption categories (between 9% for others and 18% for house equipment), a reduction in unskilled wages (1.59%) and small increase in skilled wages (0.89%).

A hypothetical increase in the external tariff of Mercosur would also have a negative impact on households' welfare in Argentina. The overall effect is around 10% of initial income, with once again the effect felt stronger among poor households. The result is driven by the increase in consumer prices and less by the labor income effect that is negative for unskilled workers and close to zero for those who are considered as skilled.

If Latin America as a whole decides to increase protection through non tariff barriers and increasing trade facilitation costs the welfare effect will be once again negative for households in Argentina. However the effect is smaller, ranging between 6.5% and 7.5%. The negative effect is increasing in the level of livelihood because skilled wages decrease more than unskilled wages. More than two third of the negative effect is explained by the increase in price in all consumption categories.

The last scenario of protectionism we consider in Argentina is the case of an increase of non tariff barriers and facilitation cost at the world level. In that case both skilled and unskilled wages

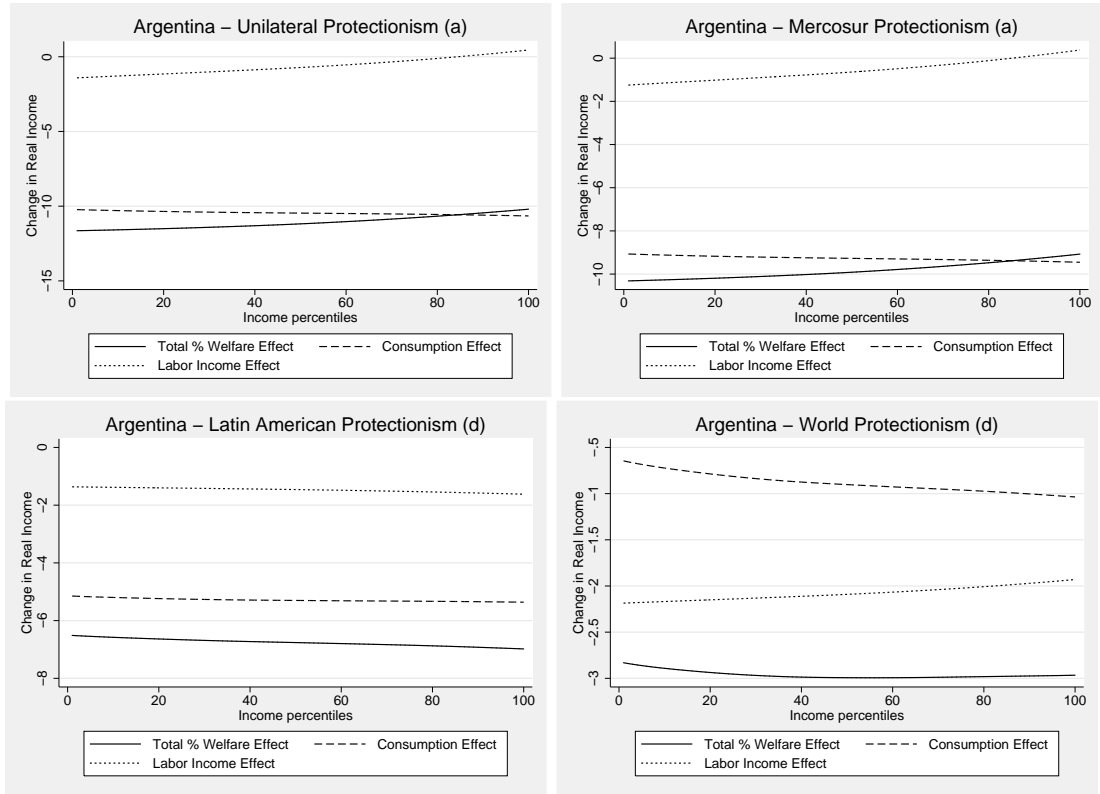


Figure 2: Argentina - Protectionism

would decline and the change in consumption prices would vary significantly across categories. For instance, there would be a moderate decline in the price of food and beverages, leisure goods, and health and education, and a significant increase in the price of house equipment in Argentina. The overall effect is negative with the income measure of welfare declining between 2.8% and 3%. The negative effect is somehow smaller for poorer households as they benefit from lower prices for food and beverages goods, an item that often accounts for a large share of their budget.

5.1.2 Liberalization Scenarios

We now consider liberalization scenarios in Argentina. We first consider the case of unilateral trade liberalization. We consider two variations; the first one is through a reduction in tariff (a) and the second through a combination of tariffs, non tariff barriers and facilitation costs (c). In the case of tariffs cuts only, there is a moderate reduction in the price of all consumption categories (between 1.6% and 4.4%), a moderate increase in the wage of low skill workers and a modest reduction in skilled wages. The overall effect is an increase in welfare between 2.1% and 2.3%. The effect is larger for poorer households and therefore unilateral liberalization in this case is pro-poor. When we consider the extended case of unilateral liberalization (c), the welfare gains are higher, reaching more than 16% across all levels of income. Sixty percent of those gains come from the reduction in prices enjoyed by consumers in all categories (from 2.4% in leisure goods to 28.3% in house equipment). The difference between the welfare gains in the

two liberalization scenarios illustrates the important role played these days by non tariff barriers and trade facilitation costs.

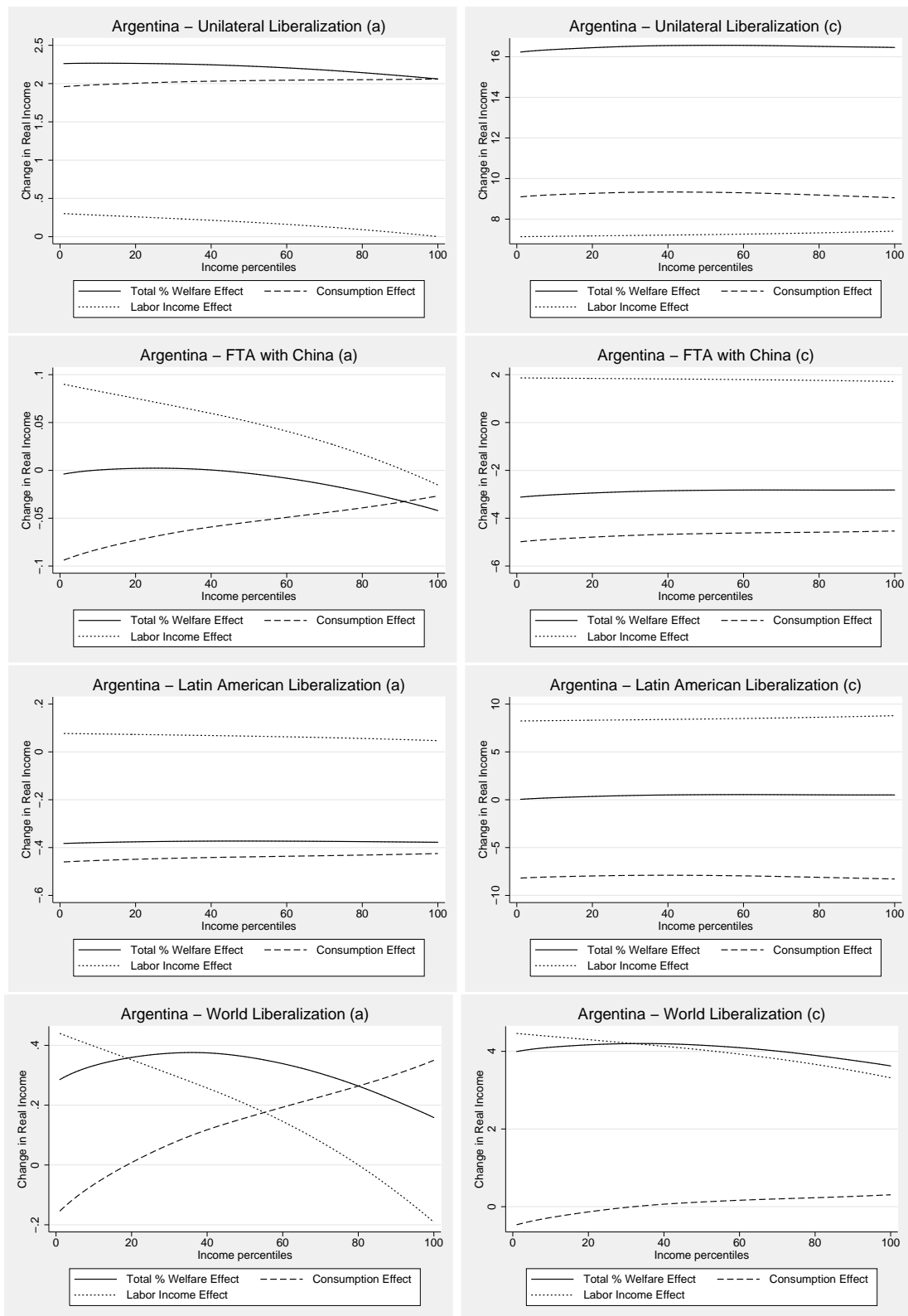


Figure 3: Argentina - Liberalization

The next two graphs show the welfare effect for Argentinean households of a possible Free Trade Agreement with China. As before we consider a scenario with tariff cuts only and other where these tariffs cuts are complemented with the removal of non tariff barriers and the reduction of trade facilitation costs. An FTA with China is an interest case where the reduction of tariffs with a potential large partner may have negative effects for the domestic economy. In the case of only tariffs cuts, the agreement will reduce the price of clothing and house equipment in Argentina but increase the price of consumption goods in all other categories. The overall consumption effect is negative and it is stronger for the poorest households in Argentina. The labor income effect is moderately positive for households in the low side of the income distribution and slightly negative for the richest households. The overall effect is neutral for household in the low side of the income distribution and slightly negative for those households above the median income. In the case of an extended FTA with China where most trade barriers are reduced, the overall welfare effect is expected to be negative (around 2.5%-3%) for the average household across the income distribution. This is the result of a positive labor income effect (around 2%) and a negative consumption effect (between 4.5%-5%). This result suggests that deeper integration with China may not be in the interest of the Argentinean economy.

We next consider the case of the effect on Argentinean households of further trade liberalization in Latin America. In the case of only tariffs cuts, the marginal labor income positive effect does not compensate the moderate price increases in all consumption categories leading to a negative welfare effect across the income distribution. In the case of comprehensive trade liberalization, the overall welfare effect is zero or slightly positive with significant increases in real wages for both skilled and unskilled workers (more than 8%) compensated with price increases in five of the seven consumption baskets.

The last scenario we consider for Argentina is the case of multilateral liberalization. In the case of only tariffs cuts, the welfare effect is on average positive for all households in Argentina. The gains first increase with the level of livelihood and start declining beyond the second quintile. This pattern is the result of a consumption effect that is increasing in the level of livelihood (it is negative for the poorest household because the increase in the price of food and beverages) and the labor income effect that is declining in the level of income (multilateral liberalization reduces the wages of skilled workers and increases the wages of unskilled workers in Argentina). The pattern is similar in the case of extended multilateral liberalization but the welfare effects are larger (4%) than in the only tariffs cuts case (0.3%).

5.2 Brazil

In the case of Brazil we do not have data on expenditure shares and therefore we limit the analysis to the effect of trade policies on labor income across the entire income distribution. We consider both cases of increased protectionism and further liberalization.

5.2.1 Protectionism Scenarios

Protectionism would have a negative effect on labor income across the income distribution in Brazil. The largest effect would come from increase protection in the world (almost 2%) and Latin America (a decline of real income between 1.5% and 1.8%). The effects of unilateral and Mercosur increases in protectionism are also negative but decreasing with the level of livelihood. In the case of Mercosur the reduction in labor income is not significantly different from zero for the households in the upper tail of the income distribution.

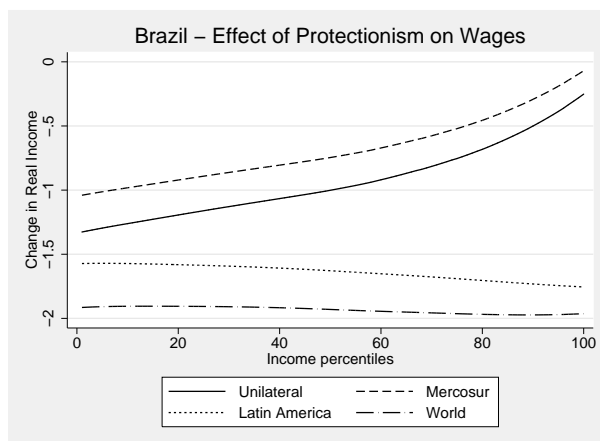


Figure 4: Brazil - Protectionism

5.2.2 Liberalization Scenarios

The case of the effect of the different liberalization scenarios on labor income in Brazil when only tariffs cuts are considered is interesting. In the case of an FTA with China and Latin America integration, the labor income effect is not statistically different from zero for households across the whole income distribution. The effect is positive but decreasing on the level of livelihood in the case of unilateral liberalization and negative and decreasing in the case of multilateral liberalization.

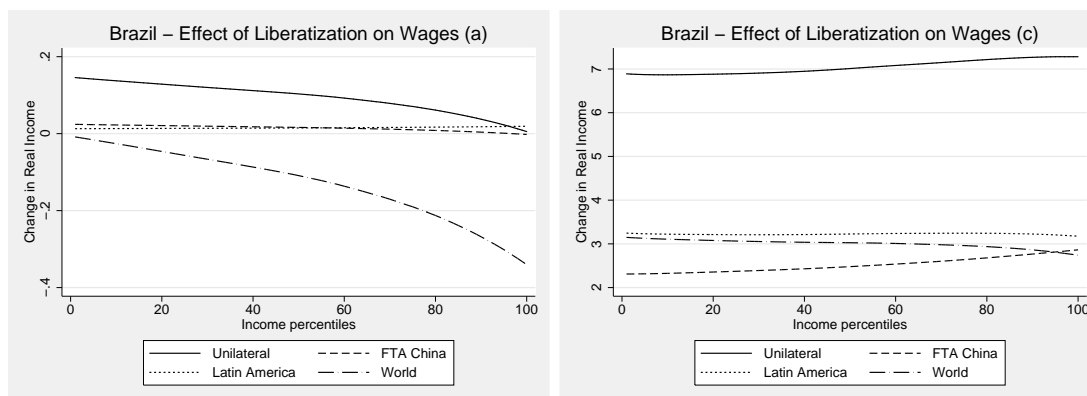


Figure 5: Brazil - Liberalization

The results change when we take into account full liberalization. The effects are positive and larger for the four cases of liberalization. The unilateral liberalization has the strongest positive effect (around 7%) on labor income and the effect is slightly higher for richer households. In the case of Latin American integration the effect is constant around 3.2%. The labor income effect is declining in the level of livelihood in the case of multilateral liberalization and increasing in the case of an FTA with China.

5.3 Colombia

As in the case of Brazil, we do not have data on expenditure shares for Colombian and therefore we limit the analysis to the effect of trade policies on labor income.

5.3.1 Protectionism Scenarios

Accordingly to our simulation, the increase in protectionism of Mercosur will have a negative effect on labor income in Colombia but that effect is not significantly different from zero. An unilateral increase in protectionism has a negative effect in the earnings of the low skilled workers and a positive effects in the case of skilled workers. The labor income effect is negative in the case of an increase of protectionism in Latin America and the World. Those negative effects are significantly different from zero and are estimated between 2.5% and 4% of initial income.

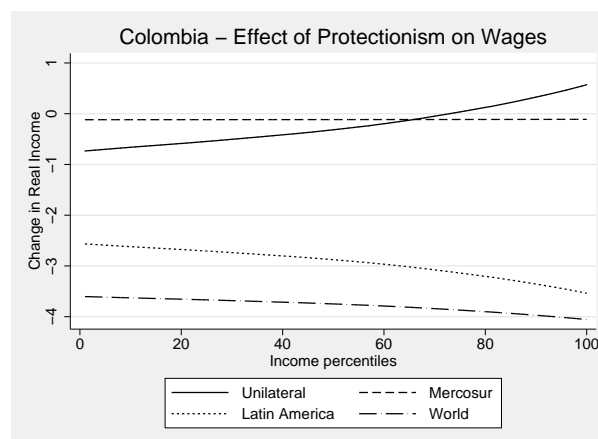


Figure 6: Colombia - Protectionism

5.3.2 Liberalization Scenarios

The first batch of liberalization scenarios consider the case of only tariffs cuts. The effects are positive and pro-poor in all cases but in the scenario of FTA with China. In this case, the effect on labor income is negative but not significantly different from zero.

When we consider liberalization scenarios that take into account not only tariffs cuts but also not tariff barriers and trade facilitation costs, the positive effects on labor income from Colombian

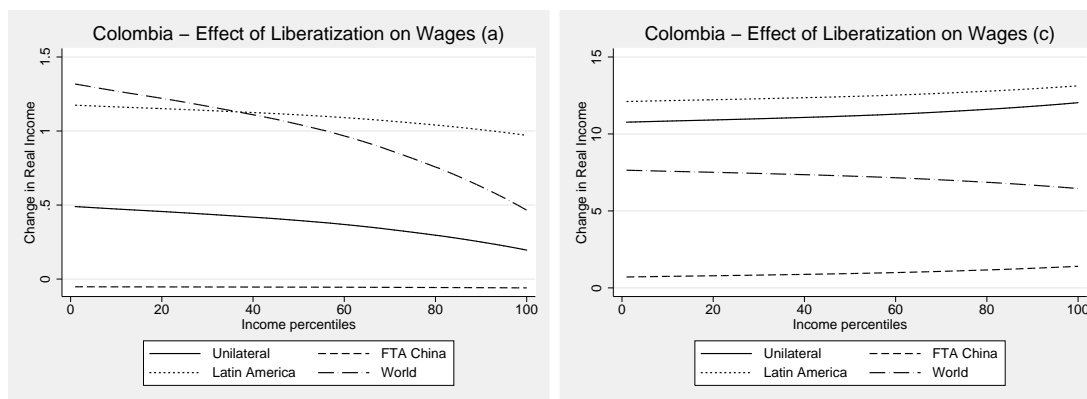


Figure 7: Colombia - Liberalization

households are much larger. Those effects are around 7-8% for multilateral liberalization, 11-12% for unilateral liberalization, and 12-13% in the case of Latin American integration. Only in the case of an FTA with China the labor income effects will be modest (1-2%).

5.4 Peru

As in the case of Brazil and Colombia, we do not have data on expenditure shares for Peruvian households and therefore we limit the analysis to the effect of trade policies on labor income.

5.4.1 Protectionism Scenarios

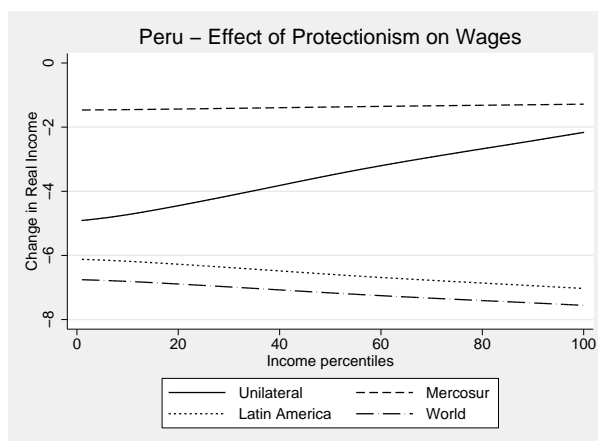


Figure 8: Peru - Protectionism

Like in the case of Brazil, the increase of trade protectionism in Peru whether is unilateral, coming from Mercosur, Latin America, or multilateral has a negative effect in labor income across the entire income distribution. The largest decreases are observed in the case of multilateral and Latin America increase in protectionism with negative effects between 6% and 7.5% of initial income. In the case of unilateral increase in protectionism, the negative effect is larger for poorer households (4.8%) than the wealthiest one (2.1%). The effect of Mercosur protectionism is more

or less constant across the income reduction with a welfare lost equivalent to around 1.7% of initial real income.

5.4.2 Liberalization Scenarios

Tariffs cuts in Peru have positive labor income effects across the entire income distribution and are in the four scenarios pro-poor as the wage rate of unskilled workers increase more than the skilled counterpart. The largest effects are found in the case of multilateral tariffs cuts where the poorest Peruvian families will see their labor income increase up to 2.5% while the richest households will gain around 1%. The lowest gains (around 0.25%) would occur in the Latin American integration scenario.

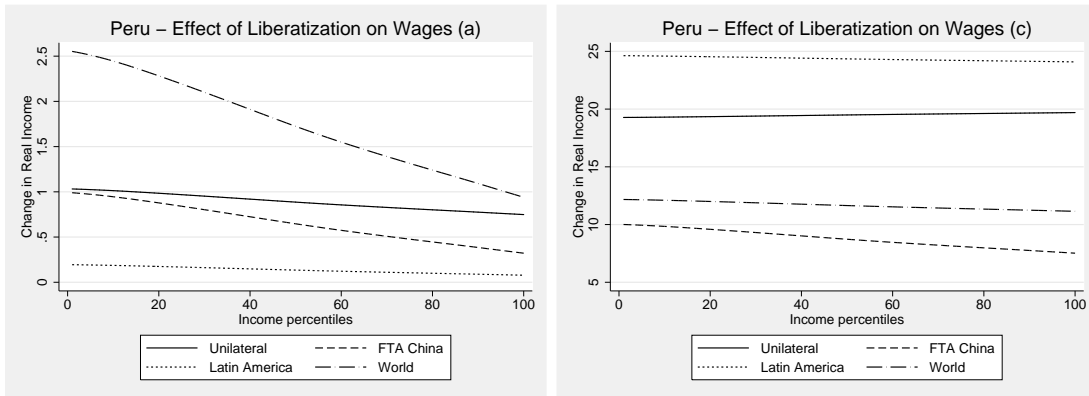


Figure 9: Peru - Liberalization

The extended liberalization scenarios in Peru are the ones that show largest labor income gains of the four countries considered. Those gains go from around 8%-10% in the case of an FTA with China up to 24% in the case of Latin American integration. Except for the case of unilateral liberalization, the other scenarios seems to be slightly pro-poor.

6 Final Remarks

In this paper we study the welfare effect of alternative trade policy scenarios in four Latin American countries, specifically Argentina, Brazil, Colombia and Peru. We analyze both cases on increased protectionism and liberalization. In the case of protectionism we examine the case of increased unilateral protection and cases of multilateral protectionism, namely Mercosur, Latin America and the world. For the case of liberalization we consider unilateral liberalization, a bilateral FTA between each of the four countries and China, Latin American integration, and multilateral liberalization. For each scenario, we consider alternative modalities. The first modality assumes changes in the present applied tariffs, the second modality adds changes in non-tariff barriers, and the last one also includes a rise (or a decrease depending on the scenario) in other trade costs linked to time. The impact of the different trade policies is assessed in two different ways. We first use the multi-sectoral and multi-regional computable general equilibrium MIRAGE model to assess the effects of trade policy in outcome of interest such as GDP, exports,

imports, terms of trade, real wages, and welfare. The second approach is to follow the trade and poverty literature and use the price and factor remuneration changes from each simulation to feed them into household survey data and assess the welfare effect on households.

The main conclusion of the analysis is that in most cases liberalization scenarios dominate scenarios with increasing protectionism. However, the simulations show that in some cases there may be welfare gains from unilateral protectionism. Scenarios where countries unilaterally increase their tariff levels generate short run welfare effects coming from improvements in the terms of trade. These gains disappear when the tariff escalation is combined with a rise in non-tariff barriers and costs associated with time. In those cases allocation efficiency loses dominate and as a result countries are worse off. An increase in the common tariff of Mercosur would also produce short run welfare gains for Argentina and Brazil. However, the dangers of unilateral increases in protectionism are displayed in a possible case of a retaliation that leads to a closer Latin America and more protectionism worldwide. The simulations considering worldwide increases in protectionism produce important welfare losses for the four countries under consideration. We were also interested in assessing the effects of further liberalization. Increased openness would improve welfare in most cases but not in all scenarios. Unilateral tariffs cuts would lead to a reduction of welfare due to deterioration in the terms of trade faced by the country. On the hand, unilateral liberalization scenarios where tariffs cuts are accompanied with reduction in NTBs and reductions in facilitations costs are welfare improving. Unilateral Free Trade Agreements between each country and China would have positive effects for Colombia and Peru and ambiguous effects for Argentina and Brazil depending on the modality under which the agreement is implemented. Latin American integration is always welfare improving and delivers the highest welfare gains for the four countries. Finally, worldwide liberalization is welfare improving in all cases but one (Argentina under the tariffs cuts only modality).

In our analysis we also combine the price and wage changes from each scenario with household survey data to assess the welfare impact at the household level. In the case of Argentina we have data on both wages and budget share for different goods and therefore we can estimate the overall welfare effect. The analysis shows that protectionism has negative effect across the entire income distribution and the effect is particularly severe for the poorest households. Liberalization scenarios improve households' welfare in most cases. However, a FTA with China would negatively affect households in Argentina. For Brazil, Colombia and Peru we only have wage data so we estimate the labor income effect of the different trade policy scenarios. The different protectionism scenarios reduce labor income across the entire income distribution for the three countries, except for rich households in Colombia in the case of unilateral protectionism. Liberalization either increases labor income or leave it unchanged in all scenarios but in the case of an FTA between Brazil and China that will negatively affect most households.

Our results are indicative of the possible welfare effects of both protectionism and liberalization in Latin American countries showing that short run gains from protectionism could lead to sub optima equilibria when countries retaliate. These findings are subject to important caveats related to the circumstances of the Latin American countries under study and the limitations of our CGE model. The first limitation in the analysis is that we have a stylized version of the world economy and some important elements, especially those related to the political economy

of trade policy, are missing in the analysis. Also, the model does not allow for changes in factors' endowments (neither migration nor foreign direct investment are allowed) and assumes production factors to be fully employed. A second limitation in our analysis is that we are not incorporating estimates of second order effects in the household welfare analysis in section 5, despite the fact that the CGE provides these estimates. A third limitation of the analysis is that the price and wage simulations in section 4 are used across all type of households and sector of employment. For instance, a richer model should incorporate wages that are sector and skill specific to better explain the effect of trade policies on labor income.

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