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Trade Reforms, Market Access and Poverty in Argentina

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Abstract

This paper examines the impact of national and foreign trade reforms on poverty in Argentina. National reforms include the removal of Argentine import tariffs. Foreign reforms include the elimination of agricultural subsidies, and tariffs and non-tariff barriers in developed countries (i.e. the United States and the European Union). From a head count ratio of 25.7 percent in 1999, a combination of domestic and global trade liberalization would cause a decline of between 1.6 and 4.6 percentage points in the poverty rate. The marginal effects of national trade reforms are larger than those of foreign trade reforms. However, there is a much greater scope for policy reforms in developed countries. In Argentina, in the end, I find that foreign reforms are more important than national reforms in terms of poverty alleviation.

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1 Introduction

Much of the literature that studies the relationship between trade and poverty in developing countries focuses on the effects of *national trade reforms*, such as own tariff reductions (Porto, 2002; Goldberg and Pavcnik, 2003). In contrast, the WTO negotiations at the Doha Round were more concerned with the poverty effects, on low-income countries, of *foreign reforms*, such as the elimination of agricultural subsidies in developed economies. The purpose of this paper is to empirically compare the relative poverty impacts of national and foreign trade reforms in Argentina.

The national trade reforms investigated in this paper include tariff cuts on consumption goods (food, appliances) and capital goods (machines) in Argentina. These policies generate a decline in the domestic price of these goods. Foreign trade reforms include the elimination, in developed countries, of agricultural subsidies and trade barriers (tariff and non-tariff) on agricultural manufactures (dairy products, beef, oils) and industrial manufactures (textiles, transport materials, chemicals). These policies enhance the market access of Argentine exports and cause an increase in the international (and hence in the domestic) prices of these goods.

The theoretical links that form the basis of the methodology used in this paper are simple. The policy induced changes in the prices of traded goods that Argentine consumers and producers face generate a change in the relative demand of different factors of production, particularly labor. As a result, wages and household income react and poverty is affected.

The estimation of the poverty impacts of trade liberalization comprises three steps. First, I assess the changes in the prices of imports and exports induced by national and foreign trade reforms. Second, I estimate wage price-elasticities that measure the responses of Argentine wages to the price changes. Finally, I use the simulated policy-induced price changes and the estimated wage price-elasticities to predict the labor income that would hypothetically be earned by each Argentine household after the reforms. To study the poverty impacts, I compute pre- and post-policy head-count ratios.[1]

[1]The head count ratio is the proportion of the population with an income lower than the poverty line (the amount of money needed to purchase a basic bundle of food and non-food products).

To compare the relative effects of national and foreign policies, I distinguish the *marginal effects* of the reforms, i.e. the marginal effect of a trade policy on household income, from the *scope for reforms*, i.e. the room for further policy changes. In Argentina, I find that national trade reforms have larger marginal effects than foreign trade reforms. However, since there is greater room for foreign reforms, policy changes in developed countries would have, in the end, larger poverty impacts.[2] Specifically, the joint elimination of Argentine tariffs on consumption goods and capital goods would cause the head count ratio to decline by between 0.6 and 1.7 percentage points. Foreign policies on agriculture and industry would lower the poverty rate by between 1.4 and 2.9 percentage points. Overall, a combination of own reforms and enhanced market access would cause poverty to decline by between 1.7 and 4.6 percentage points. With an actual initial head count ratio of 25.7 percent, this evidence suggests that trade policies can be important poverty-reducing instruments in Argentina.

The paper is organized as follows. In section 2, I define the poverty indicator, namely the head count ratio, and I use it to characterize the poverty situation in Argentina during recent years. Section 3 discusses the methodology used to estimate the changes in household income, the wage price-elasticities, and the poverty measures. Section 4 implements the methodology using Argentine data and assesses the poverty impacts of national and foreign trade reforms in the country. Section 5 provides a conclusion of findings.

2 Poverty in Argentina

The poverty measure used in this paper is the head count ratio, HC, defined as the fraction of the population with an income below the poverty line z. That is,

$$HC = \frac{1}{N} \sum_i 1\{y^i < z\}, \tag{1}$$

where N is the total population and $1\{\}$ is an indicator function that takes the value of one if the argument within brackets is true. The poverty line z is the level of income

[2] In other countries with higher national trade barriers (such as tariff or quantitative restrictions), own reform is likely to be more important.

needed to purchase the poverty consumption basket, which includes food items that satisfy a minimum caloric and energetic intake, and non-food essential items (clothing, housing, health and education). The poverty line is measured so as to account for the different caloric requirements of individuals with different characteristics, such as sex and age.[3] This means that z and individual income, y^i, are measured in per equivalent adult units (Deaton, 1997). In Argentina, the National Institute of Statistics and Census (INDEC) estimates poverty lines and per equivalent adult scales (INDEC 2002).

The poverty analysis focuses on the metropolitan area of Buenos Aires, the most populated urban area in Argentina (comprising around one third of the population of the country).[4] After a peak of 47.3 percent in 1989, due to a hyperinflation episode, the head count ratio decreased until May 1994. Since then, it has steadily increased. In 1992, when a number of reforms began, the poverty rate fluctuated around 18-19 percent. Whereas in 1999, the baseline period that I use to explore the effects of trade policies, the head count ratio was 25.7 percent.[5]

Figure 1 plots the density of the logarithm of individual income per equivalent adult (lpai) in October 1999 (in monthly dollars) in Gran Buenos Aires (GBA). The density is estimated with standard kernel methods using the optimal bandwidth and a Gaussian Kernel (Pagan and Ullah, 1999; Silverman, 1986). There are two vertical lines in Figure 1. The rightmost vertical line at lpai=5.04 (so that income per equivalent adult is \$155, around \$5 per day) represents the official poverty line z for October 1999. The area below the density curve and to the left of this poverty line is the proportion of poor people in Buenos Aires, 25.7 percent. The leftmost vertical line at an income per equivalent adult of 65 monthly dollars represents the indigence line, the expenditure needed to purchase a minimal food bundle only. In October 1999, 11.3 percent of the population of GBA was living in extreme poverty.

[3] The reference group comprises adult males. The caloric requirements of other individuals are measured relative to this reference group (so that, for instance, an adult male requires more calories than an adult female, and children require less calories than adults).

[4] The reason why I look at Gran Buenos Aires (the metropolitan area) is that, before 2001, poverty lines were calculated only for this area.

[5] I chose 1999 as the baseline year to isolate the impact of the recent recession and current crisis. In 2002, the head count ratio reached 49.7 percent, a figure that characterizes the impact of the crisis that is hitting the country.

The purpose of this paper is to assess how poverty, as measured by the head count ratio, is affected by national and foreign trade policies. I do this by predicting the new income that each Argentine household would earn as a result of a policy change and by comparing the pre and post policy head count ratios.

3 The Methodology

Conceptually, there are three links in the methodology that I use in this paper. The initial step is a trade shock, i.e. a national or a foreign trade reform, which causes a change in the domestic prices of traded goods (exports and imports) in Argentina. The second step is the response of the labor income of Argentine households, which leads to the third step, the induced change in the head count ratio. Discussion of these three components follows.

3.1 Changes in the Prices of Traded Goods

The transmission of trade policies to prices is different for different goods. In this paper, I work with four different products. There are two exportable goods: *agricultural manufactures* (dairy products, beef, oils) and *industrial manufactures* (textiles, chemicals, transport material). There are two importable goods, too: *consumption goods* (food, appliances) and *capital goods* (machines). I assume that Argentina is a small open economy that faces exogenously given prices for these goods.

In principle, national and foreign trade policies may affect the domestic prices of both exports and imports. Whereas the effects of foreign policies are revealed in changes in international prices, national policies introduce a wedge between international and domestic prices. Since Argentine trade policies mostly involve intervention on imports, I focus on *national* trade policies that affect the domestic prices of importable goods. In contrast, I focus on *foreign* trade reforms that affect the price of Argentine exports for these are the most important policies from the Argentine standpoint.

Let τ_g be the national trade policy parameter (a tariff). The price of an importable in

Argentina, p_g^i, is

$$p_g^i = p_g^{i*}\psi(\tau_g), \tag{2}$$

where p_g^{i*} is the international price and $\psi(\cdot)$ is the function that characterizes the pass-through of national trade policies to domestic prices. To get the price change induced by a policy reform, I need estimates of this pass-through function, as I discuss in section 4.

For exportable products, let τ_g^* be the foreign policy parameter (tariff protection, production support or export subsidies in large developed economies). The domestic price of an exportable, p_g^e, is

$$p_g^e = p_g^{e*}(\tau_g^*), \tag{3}$$

where p_g^{e*} is the international price, which depends upon the trade policy parameter. In section 4, I discuss how to get estimates of the price change induced by trade policy reforms.

3.2 Changes in Household Income: the Wage Price-Elasticities

This section explains how to measure the changes in household income caused by trade policies. Let the income of household j, Y^j, be

$$Y^j = \sum_m w_m^j + k^j, \tag{4}$$

where w_m^j is the wage earned by household member m (head and non-head), and k^j is non-labor income, including profits, returns to specific factors and transfers.

Due to data constraints, I am forced to focus on the labor income of all household members, thus neglecting non-labor income (k^j).[6] The change in household income caused

[6]There might be concerns that leaving capital income and profits aside can produce biased results for the poverty analysis. However, such biases are unlikely to be relevant in Argentina because capital and land ownerships tend to be concentrated in the upper tail of the distribution of income, with no poverty impacts.

by a change in the policy parameter τ_g^* that affects the price of an exportable good p_g^e is

$$dY^j = \sum_m \frac{\partial w_m^j}{\partial p_g^e} \frac{\partial p_g^e}{\partial \tau_g^*} d\tau_g^* + \frac{\partial k^j}{\partial p_g} \frac{\partial p_g^e}{\partial \tau_g^*} d\tau_g^*. \tag{5}$$

A similar expression can be obtained for the case of a trade policy that affects import prices. The proportional changes in the total (labor) income of household j is given by

$$\frac{dY^j}{Y^j} = \sum_m \theta_m^j \varepsilon_{w_m^j} \frac{\partial \ln p_g^e}{\partial \tau_g^*} d\tau_g^*, \tag{6}$$

where $\varepsilon_{w_m^j}$ is the elasticity of the wage earned by household member m with respect to the price p_g^e, and θ_m^j is the share of the labor income of the member m in total household income.

For a policy change from τ_g^* to $\widetilde{\tau_g^*}$, the change in the income of household j, ΔY^j, can be estimated with

$$\widehat{\Delta Y^j} = Y^j \left(\sum_m \theta_m^j \widehat{\varepsilon}_{w_m^j} \right) \widehat{\Delta \ln p_g^e}(\tau_g^*; \widetilde{\tau_g^*}), \tag{7}$$

where $\widehat{\Delta \ln p_g^e}(\tau_g^*; \widetilde{\tau_g^*})$ is the predicted change in the price of good g that is caused by the change in policy, and $\widehat{\varepsilon}_{w_m^j}$ is the estimated wage price-elasticity. Finally, the income of household j after the policy change is given by

$$\widetilde{Y^j} = Y^j + \widehat{\Delta Y^j}. \tag{8}$$

A key component of the methodology used here is the estimation of the wage price-elasticities. In a small open economy, there is a theoretical general equilibrium relationship between traded good prices and factor prices. In a two-good, two-factor model, this relationship is established in the Stolper-Samuelson theorem: an increase in the relative price of a traded good causes a more than proportional increase in the price of the factor intensively used in its production. For multidimensional models, it is only possible to predict *correlations* between movements in factor prices and movements in product prices (Dixit and Norman, 1980; Helpman, 1984). Similar caveats apply when factor supplies are endogenous (Dixit and

Norman, 1980; Woodland, 1982). Learning the signs and magnitudes of these correlations becomes an empirical question.

In what follows, I build a general equilibrium model that illustrates how factor prices (particularly wages) are determined. Equilibrium wages result from the behavior of workers and firms. The behavior of individual j is represented by the expenditure function, the minimum expenditure needed to attain utility level u^j.[7] I assume that factor endowments are endogenous (i.e., there is a leisure consumption choice) so that the expenditure function e^j is

$$e^j = e^j(\mathbf{p}, L^j, u^j; \boldsymbol{\chi}), \tag{9}$$

where $\mathbf{p}$ is the vector of prices of consumption goods, L^j is the labor supply (hours) and $\boldsymbol{\chi}$ is a vector that represents expenditure shifters, such as household characteristics. It is a property of this modified expenditure function that the derivative of e^j with respect to L^j gives the supply wage (Dixit and Norman, 1980).

Demand for labor can be obtained from the revenue function π that shows the maximum revenue or GDP produced at prices $\mathbf{p}$ and factors $\mathbf{v}$. That is

$$\pi = \pi(\mathbf{p}, \mathbf{v}, \boldsymbol{\phi}), \tag{10}$$

where $\boldsymbol{\phi}$ is a vector of profit-shifters: variables that affect the decisions of firms, technical change. It is a property of the GDP function (Hotelling's Lemma) that its derivative with respect to the labor endowment gives the demand wage.

By equating the supply and demand wages, the equilibrium wage w^j is defined by

$$w^j = w^j(\mathbf{p}, \mathbf{v}; \mathbf{u}; \boldsymbol{\chi}, \boldsymbol{\phi}), \tag{11}$$

where $\mathbf{u}$ is a vector of utilities.

For the estimation of (11) to be feasible, some structure has to be imposed. In particular,

[7] I use the expenditure function to derive a theoretical relationship between prices and wages. For the poverty analysis, I use expression (1), which defines the income of households j.

I assume that the conditions of the factor price insensitivity theorem hold (Feenstra, 2003). In a model with constant returns to scale, perfect competition and as many traded goods as factors, wages are fully determined by the prices of the traded goods (which are exogenous). This is because the system of average cost (zero profit) pricing conditions has a unique solution in factor prices.[8] Under these assumptions, (11) simplifies to

$$w^j = w^j(\mathbf{p}; \boldsymbol{\chi}, \boldsymbol{\phi}), \tag{12}$$

which can be estimated with data on wages, prices of traded goods, household characteristics and controls for technical change.

The approach followed here attempts to recover the wage price-elasticities using household surveys as a source of data on individual labor income. In Argentina, the necessary data are available in the Permanent Household Survey (Encuesta Permanente de Hogares, EPH). The EPHs are labor market surveys with information on wages, employment, hours worked, and individual and household characteristics.[9]

The main problem of using survey data to estimate the wage price-elasticities is the lack of price data at the level of the household. To deal with this, I exploit the time variation in prices and surveys. In fact, the EPH surveys are gathered in May and October every year, so that sixteen surveys from 1992 to 1999 (two per year) can be used to identify the elasticities. This method adapts techniques used in demand analysis. Wolak (1996), for instance, estimates a system of demand elasticities using the time variation in CPS surveys in the United States. Similarly, Deaton (1997) develops methods to estimate demand elasticities using regional variation in unit values. Finally, Goldberg and Tracy (2003) use CPS wage data and industry specific exchange rates to estimate the factor income effects of exchange rate movements.

The relationship between wages and prices in (12) is possibly different for different types of labor because the response of wages to the same price may depend, in principle, on skill

[8] See Dixit and Norman (1980) or Woodland (1982) for a detailed analysis of the relationship between product prices and factor prices. See also Feentra (2003) for a more recent description of the factor price insensitivity model.

[9] In Appendix 1, I describe the data in detail.

intensities. I define three labor factors: unskilled labor (comprising individuals with only primary education), semiskilled labor (comprising individuals having completed secondary education), and skilled labor (comprising workers holding college degrees).

Let $\mathbf{E}^j$ be the 1x3 j^{th} row of a matrix $\mathbf{E}$ of dummy variables for the three educational categories of labor. I capture the differential impact of prices on the wages of individuals with different skills with the following model[10]

$$\log w^j = \alpha + \sum_g \left(\mathbf{E}^j \log p_g^j\right) \boldsymbol{\beta}_g + \mathbf{E}^j \boldsymbol{\gamma} + \mathbf{z}^{j\prime} \boldsymbol{\delta} + \mu^j. \tag{13}$$

In (13), $\boldsymbol{\gamma}$ is the coefficient vector associated with the educational dummies and $\mathbf{z}^j$ is a vector of individual characteristics, such as age, gender and marital status. The variable $\log p_g^j$ is the logarithm of the international price of traded good g (agricultural manufactures, industrial manufactures, imported consumption goods and capital goods).[11] In a given time period, all households face the same prices. The index j attached to the prices in (13) captures the fact that I work with different surveys in time periods with different prices. The estimated wage-price elasticity for individual j with respect to price p_g is given by $\mathbf{E}^j \widehat{\boldsymbol{\beta}_g}$. Finally, μ^j is an error term.

A consistent estimate of the wage elasticities $\boldsymbol{\beta}_g$ requires exogenous domestic prices and exogenous trade reforms. To solve the problem of potential endogenous policy, I use the international price indexes as regressors in (13).[12] Since for a small open economy international prices are exogenously given, the regression model estimates $\boldsymbol{\beta}_g$ consistently.[13]

In the model specified in (13), equilibrium wages are determined by individual characteristics (to account for the heterogeneity of labor supply) and prices (to account for labor demand). In addition, I include time trends in the regressions, interacted with the

[10] This is a varying coefficient model. See Hsiao (1986), Swamy (1971) and Raj and Ullah (1980).

[11] A number of alternative specifications proved that the model in (13) is robust. Including regional and sectoral dummies does not affect the results. For presentational simplicity, I decided to estimate (13) directly.

[12] These prices are published by the Argentine Institute of Statistics and Census (see Appendix 1)

[13] For consistency, it is required that the pass-through function be uncorrelated to the international price. Moreover, the usual assumption that domestic prices are a linear function of international prices is needed. Finally, trade policies must be exogenous to international prices. Although it is possible to think about cases in which these assumptions do not hold (as in an infant industry model), I believe they are reasonable for the Argentine case.

educational dummies, that capture technical change that may affect wages differently by skill levels.

Since all households in a given survey sample face the same prices, there may be correlation in the error terms. This is the clustering problem discussed in Kloek (1981). In the estimation of the model, I assume that the clustering effects are specific to the time period and the educational category of the individual. I use a robust non-parametric estimation of the covariance matrix to correct the standard errors of the elasticities.

Table 1 reports the estimated wage price-elasticities. I find that the prices of exportable manufactures, either of agricultural or industrial origin, impact positively on wages for workers of all skills. In contrast, higher import prices for consumption goods cause wages to decline. Finally, there is a positive effect of the prices of imported machines on the wages of Argentine workers indicating that labor substitutes for more expensive machines. For each of these prices, I find that the estimated elasticities do not vary much by skill levels. The finding that the wages of skilled and unskilled workers react in the same direction to trade liberalization is perfectly consistent with the theoretical correlations between factor prices and product prices since I do not restrict the model to display Stolper-Samuelson effects.

The bottom panel of Table 1 reports the coefficients of the time trends, interacted with the educational dummies (so as to measure different types of technical change). The trend coefficients are positive and increasing in the skill level. These controls thus capture the increasing inequality in the functional distribution of income, a characteristic feature of the Argentine economy during the 1990s.

3.3 Poverty Impacts

To carry out the poverty analysis, I simply compare the proportion of poor individuals before and after the reforms. Given a poverty line z of \$155 in October 1999 (the baseline period), the head count ratio is given by $F(z)$, where $F(\cdot)$ is the observed cumulative distribution function of income *before* the policy reform. To compute the head count ratio *after* the policy reform, I have to estimate the post-policy per equivalent adult income $\widetilde{y}^j$, for each Argentine household. To do this, I use the predicted change in income given by (7) to estimate the

counterfactual income, $\widetilde{Y}^j$, of Argentine households, which is defined by (8).

To get the per equivalent scale measure, the counterfactual household income is devided by the adult scales reported in INDEC (2002). Let $\widetilde{F}(\cdot)$ be the cumulative distribution function of the log of counterfactual household income $\widetilde{y}^j$ generated by the policy $\widetilde{\tau}$.[14] The post policy head count ratio is therefore $\widetilde{F}(z)$. Accordingly, the change in policy τ will be poverty decreasing if

$$F(z) \geq \widetilde{F}(z). \tag{14}$$

In this paper, I want to make a distinction between the *marginal effect of the reform*, i.e. the induced marginal change in the income of the household, and the *scope for reforms*, i.e. the room for (further) changes in policies. This distinction is crucial to understand the relative poverty impacts of national and foreign trade reforms in Argentina. To clarify matters, the change in the head count ratio, ΔHC, is written as

$$\Delta HC = \sum_i 1\left\{\widetilde{y}^j < z\right\} - \sum_i 1\left\{y^j < z\right\}. \tag{15}$$

The marginal effect of a trade policy reform is given by the change in the head count ratio caused by a small change in the policy parameter. If I estimate these marginal effects by counting the number of poor people before and after a small policy reform, the head count ratio will be estimated with a large bias given the small sample that will be affected by the reform. In this case, it is convenient to estimate the marginal effects using the empirical approximation to the theoretical formula (15). This is given by

$$\widehat{\Delta HC} = \int_0^z \widehat{f(\widetilde{y})} d\widetilde{y} - \int_0^z \widehat{f(y)} dy. \tag{16}$$

[14] Note that the change in policy affects not only the distribution function but probably the poverty line, too. In Argentina, the available consumption data at the level of the household (provided by the 1997 Expenditure Survey) is not comparable to the income data (provided by the Permanent Household Surveys). I am therefore unable to update the poverty line z. There is evidence, however, that indicates that this is not a serious problem because labor income effects tend to be larger than consumption effects (Porto, 2002).

The densities of y and $\widetilde{y}$ can be estimated with standard non-parametric methods (Pagan and Ullah, 1999; Silverman, 1986). At a selected point of the support of the per-equivalent-adult income, y, the estimated change in the head count ratio is

$$\widehat{\Delta HC} = \frac{1}{nh} \int_0^z \left(\sum_i K\left(\frac{\widetilde{y}^i - y}{h}\right) - K\left(\frac{y^i - y}{h}\right) \right), \tag{17}$$

where K is the Kernel, h is the bandwidth and n is the sample size. To estimate the integral in (17), I use numerical integration (Simpson's rule).[15]

The scope for trade reform indicates the room policymakers have to introduce further reforms in an economy. In the case of trade policies, the scope for reforms depends on the initial structure of protection, which is described in section 4 below.

4 Results

4.1 Marginal Effects and the Scope for Trade Reforms

Argentina exports goods that are intensive in natural resources and labor, and imports capital and technology intensive goods. In fact, the major exportable goods in Argentina are agro-manufactures (beef, dairy products, oils and fats), which, in 1999, accounted for 35.2 percent of total exports. Industrial manufactures (textile, machinery, chemicals) represented 29.9 percent of total exports, primary products (cereals, seed, fresh vegetables and fruits), 22.1 percent, and petroleum manufactures, 12.9 percent. Argentine imports comprise capital and intermediate goods (59.3 percent), consumption goods (17.6 percent) and accessories to capital goods (16.5 percent).

The upper panel of Table 2 includes data on the structure of protection of Argentine imports and exports. These data characterize the *scope for trade reforms* in Argentina and in the rest of the world. In 1996, Argentina, Brazil, Paraguay and Uruguay implemented

[15] I construct a grid that equally divides the interval of integration into subintervals. I then fit a quadratic polynomial in each subinterval so that the value of the polynomial function is equal to the value of the integrand function at the endpoints and midpoint of each subinterval. Analytical integration of each polynomial gives the area, within each subinterval, below the integrand (Judd, 1998).

MERCOSUR, a regional trade agreement. A common external tariff was adopted and intrazone tariffs were eliminated. In Table 2, the average common external tariff on imported consumption goods is 13.2 percent. For all of these goods, the intrazone tariff (import tax on Mercosur members) is zero. The average tariff, weighted by import shares, is 10.1 percent. The average common external tariff on Capital Goods (machines) is 12 percent, while intrazone Mercosur trade is fully liberalized. The average tariff on machines, weighted by import shares, is 10.3 percent.

On the export side, Argentina has always faced highly distorted markets for its products, particularly for those of agricultural origin. For most of these goods, trade intervention takes the form of a tariff rate quota, a two-tier tariff structure. Argentina is assigned a quota and imports of goods within this quota pay a relatively low tariff. Out of quota imports are subject to much higher and often times prohibitive tariffs. There are also a number of non-tariff barriers, such as sanitary standards and, more importantly, subsidies to domestic production or to exports. All these measures cause international prices to decline and restrict the market access of Argentine products.

Table 2 provides evidence on the magnitude of the tariff intervention in the United States, the European Union, and Canada. Tariffs are computed according to the OECD (2000) methodology and include the ad-valorem tariff on in-quota imports, the equivalent tariff on out-of-quota imports, and the ad-valorem equivalent of specific tariffs. The average tariff on agro-manufactured goods is 6.4 percent in the United State, 18.1 percent in Canada and 21.3 percent in the European Union.[16] International markets for agricultural manufactures are further distorted since many developed countries extensively subsidize agriculture production and exports. All this evidence indicates that there is great scope for changes in foreign trade-related policies.

For the industrial manufactures sectors, the average tariff is 6.9 percent in the United States, 11 percent in Canada and 6.4 percent in the European Union. Protection in developed

[16] The average tariff on Meat is low in the United States, around 2.7 percent, but it is high in Canada and the European Union, around 23.5 percent and 55.9 percent, respectively. Dairy Products (chapter 4) face an average tariff of 8.3 percent in the U.S., 190.3 percent in Canada, and 55.2 percent in the E.U. Imports of Oils and Fats (chapter 15) are subject to an average tariff of 4.9 percent in the U.S., 10.2 percent in Canada and 15.5 percent in the E.U.

countries is evidently lower in these industries.[17]

I turn now to the estimates of the marginal effects of the reforms, reported in the lower panel of Table 2. I estimate equation (17) for a small change (of one percent) in each of the prices of the four traded goods. To facilitate the comparison, I work with poverty-decreasing changes in prices; given the wage price-elasticities, this means that I work with a small increase in the prices of agro-manufactures, industrial manufactures and capital goods, and with a small price decrease in the price of consumption goods. I find that the marginal effects of changes in the prices of imported consumption and capital goods are larger than the marginal effects of exported agricultural and industrial manufactures. This means that the opportunity for positive poverty impacts are larger, on the margin, on the import side and on national trade policies. This is conditional on the scope for policy reform, which, as I showed, is much larger on the foreign trade policy side. The total effects are discussed next.

4.2 The Poverty Effects of Selected Trade policy Reforms

Foreign Trade Reforms

This section looks at the poverty impacts of foreign trade reforms. I examine the effects of increased market access by means of the elimination of tariff protection on agricultural and industrial manufactures and the removal of domestic support to production and exports of agricultural products in developed countries.

I begin with agro-manufactures (dairy products, beef, vegetable oils), the sector in which Argentina has a strong comparative advantage. For the poverty comparisons, I need estimates of the changes in international prices brought about by foreign trade policies. Due to data constraints, these changes are very difficult to estimate. As a consequence, I adopt an alternative strategy that consists of computing lower and upper bounds for the pass-through of foreign trade liberalization to prices. These bounds define the limits of the confidence band for the policy induced changes in equilibrium prices.

[17] Leather manufactures get a 7.6 percent tariff in the United States, a 10.7 percent tariff in Canada and a 5.2 percent in the European Union. Average tariffs on Wool are 9.8 percent, 13.4 percent and 7.6 percent, respectively. Finally, textile manufactures get a 15 percent, 23.3 percent and 12.8 percent tariff respectively.

There are essentially two polar approaches that can be used to estimate price changes: to recover demand and supply elasticities from the data, or to calibrate a CGE model. The elasticity methodology is based on the econometric estimation of structural parameters. This is the correct way to estimate prices changes, but scarcity of data makes its implementation generally difficult and often times impossible. The CGE modeling, in contrast, relies more on calibration and ad-hoc assumptions and allows for a more thorough computation of economic responses. I use empirical findings on these two strands of literature to define the lower and upper bounds.

One recent paper that estimates the responses of equilibrium prices of agricultural products in international markets is Hoekman, Ng, and Olarreaga (2003). The authors estimate the parameters of import demands and export supplies for different goods in different countries and use these parameters to solve for the equilibrium prices of agricultural products. Table 3 reports the price changes of the main agro-manufactures products generated by the elimination of trade protection (tariffs) and domestic support (export subsidies, production subsidies) in developed countries. The largest price increases are observed in Dairy Products (17.8 percent), Mills Products (17.4 percent), Beef (17.3 percent) and Oils and Fats (8.7 percent). Averaging the individual price changes, I get an estimate of the aggregate price change for agricultural products of 15.4 percent. This defines the upper bound.

Beghin et. al. (2002) perform a CGE study of the responses of the international prices of agricultural goods to a foreign trade reform that includes the elimination of both trade protection and domestic support. The authors compute a price increase of 10.4 percent in Beef, 9 percent in Sugar, 8.3 percent in Dairy Products, and 2.2 percent in Oils and Fats (see Table 3). The average price change in the price of agro-manufactures is estimated at 7.5 percent. This defines the lower bound.

For each of these lower and upper bounds, I estimate the response of the labor income of Argentine households. This is simply the product of the wage price-elasticities estimated in previous sections and the induced change in price. After predicting the hypothetical income of the households, poverty rates (head count ratios) are computed in the different

policy scenarios. Results are listed in Table 4. The four horizontal panels describe the initial situation, the poverty impact of foreign reforms, the poverty impacts of national reforms, and the total poverty effects. Whereas, the four columns show the total population, the total population in poverty, the head count ratio, and the change in the number of poor people.

As of October 1999, 947,570 out of a total of 3.69 million individuals were in poverty in the metropolitan area of Buenos Aires (GBA). The head count ratio was 25.7 percent. World trade liberalization in agro-manufactures would cause poverty to decline in Argentina. For the lower bound of higher prices (7.5 percent), poverty decreases to 901,623 individuals, from 25.7 percent to 24.4 percent. For the upper bound of higher prices (15.4 percent), poverty declines to 861,077 people, a 23.3 percent of the population. Based in these findings, I conclude that further global trade liberalization in agriculture will be an effective poverty reducing tool in Argentina, moving between 45,947 and 86,493 people out of poverty.

I turn next to the case of the industrial manufacture sectors, which, in Argentina, involves textiles, footwear, transport material, and chemicals. The protection granted to these industries in developed countries is lower than in agriculture, and this is why there are fewer studies investigating the response of world prices to trade reforms. I therefore adopt a calibration approach, as follows. Starting from an equilibrium in international markets, the proportional change in prices ($dlnp_g^*$) brought about by a tariff change ($dln(1+t)$) would be given by

$$d\ln p_g^* = -\frac{\varepsilon}{\eta+\varepsilon} d\ln(1+t),$$

where $\varepsilon > 0$ is the elasticity of import demand and $\eta > 0$ is the elasticity of export supply of these goods. To help determine the lower bound, I assume a low elasticity of demand of 0.5 and a high elasticity of supply of 2. With an average tariff in developed countries of 8 percent (see Table 2), prices would increase by approximately 1.6 percent. This is the lower bound for the price increase. Similarly, a combination of high elasticity of import demand and a low elasticity of export supply would cause prices to increase by approximately 7 percent. This defines the upper bound.

The poverty impacts of foreign trade reforms are included in Table 4. The general finding

is that poverty declines because higher prices for industrial manufactures imply higher wages for all workers. The head count ratio would decrease from 25.7 percent to 25.5 percent, in the lower bound, or to 25 percent, in the upper bound. The reduction in the number of poor people is, however, not trivial, ranging from 5,164 to 23,380 individuals.

Overall, foreign trade reforms would cause a decline in poverty of up to 11 percent, from an initial head count of 25.7 percent to a post-policy rate of 22.8 percent. Comparing the lower and upper bounds, there would be from 50,091 to 107,141 fewer poor people in the country.

National Trade Reforms

Finally, I investigate the implications of eliminating tariff protection on imported consumption and capital goods in Argentina. In Table 2, I reported that the average protection on these goods is 10.1 and 10.3 percent, respectively. To compute the lower and upper bound for these prices, I arbitrarily assume a low pass-through rate of 0.2 and a high pass-through of 0.8.[18] The corresponding bounds for the price changes would be 2 percent and 8 percent, respectively.

Results are listed in Table 4. After the elimination of tariffs on consumption goods, the head count ratio would decrease from 25.7 percent to between 24.3 percent and 20.9 percent. In contrast, cheaper machines (due to lower tariffs) would generate an increase in poverty because firms substitute labor of all skills for capital causing labor demand and wages to decline. In the case of the lower bound, the head count ratio would increase to 26.5 percent; in the upper bound, the poverty rate would reach 30.2 percent.[19]

Overall, a full (unilateral) liberalization of trade in Argentina would cause a decline of poverty from an initial head count ratio of 25.7 percent to 25.1 percent in the lower bound or to 24 percent in the upper bound. There would be 19,383 fewer poor in the lower bound scenario and 61,332 fewer poor in the upper bound scenario.

[18] Given the price data available in Argentina, it is impossible to accurately estimate these pass-through rates. Nevertheless, I believe these bounds provide a good sense of the likely poverty impacts.

[19] The analysis only accounts for the short-run effects on poverty, since I do not consider the growth impact of the reform.

5 Conclusions

This paper has examined the poverty impacts of trade policies. While studies of this kind tend to focus on the effects of a country's own trade reforms, here I have looked at the impact of foreign trade policies as well. Specifically, national reforms included the removal of tariff protection on Argentine imports, and foreign reforms included the elimination of agricultural subsidies and trade protection so as to enhance the market access of Argentine exports in developed countries.

To compare these two aspects of trade liberalization, a distinction between the marginal effects of the reforms (the effects of a small change in policy) and the scope for further trade reforms (the room for further changes in policy) was made. Although both national and foreign trade liberalization can significantly reduce poverty in Argentina, I found that foreign reforms are more important than own reforms. The evidence indicates that the marginal effects on poverty are larger for national policies than for foreign policies, but that the scope for reforms in developed countries is much larger, both in terms of tariffs protection, non-tariff barriers and domestic support.

To provide an accurate sense of the poverty impacts, I computed a lower bound and an upper bounds for the price changes and the induced poverty changes. As a lower bound, the head count ratio would decline from 25.7 percent to 24 percent, or by 1.7 percentage points. As an upper bound, the head count ratio would decline to 21.1 percent, or by 4.6 percentage points. Overall, the initial poverty rate would decline by between 6.6 percent and up to 18 percent.

Appendix 1: Data

In this Appendix I describe the data that I use to estimate the wage price-elasticities. My method identifies these elasticities using a time series of households surveys and prices. In Argentina, the main source of labor market information is the Permanent Household Survey, Encuesta Permanent the Hogares, or EPH. These surveys are collected in May and October in each year.[20] The main source of price data is the National Institute for Statistics and Census (INDEC). The Institute publishes price data on the main exports and import categories in

[20] In recent years, an additional interview was added in August.

Argentina. I use the time series of export prices of agricultural and industrial manufactures and the import prices of consumption and capital goods.

The key insight of the empirical methodology is the use of the wage data in the EPHs with the export and import price data. For a given interview period (May or October) in a given year, all households face the same prices. Identification comes from the time variation in prices and surveys. Specifically, I use data from 1992 to 1999, sixteen surveys in total. This strategy is analogous to similar approaches used mainly in demand analysis (Deaton, 1997; Wolak, 1996).

Table A.1 briefly summarizes the data on wages, for different skills, and prices, for exportable and importable products. Sample sizes in each time period are also reported.

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Figure 1. Density of per-equivalent-adult Income

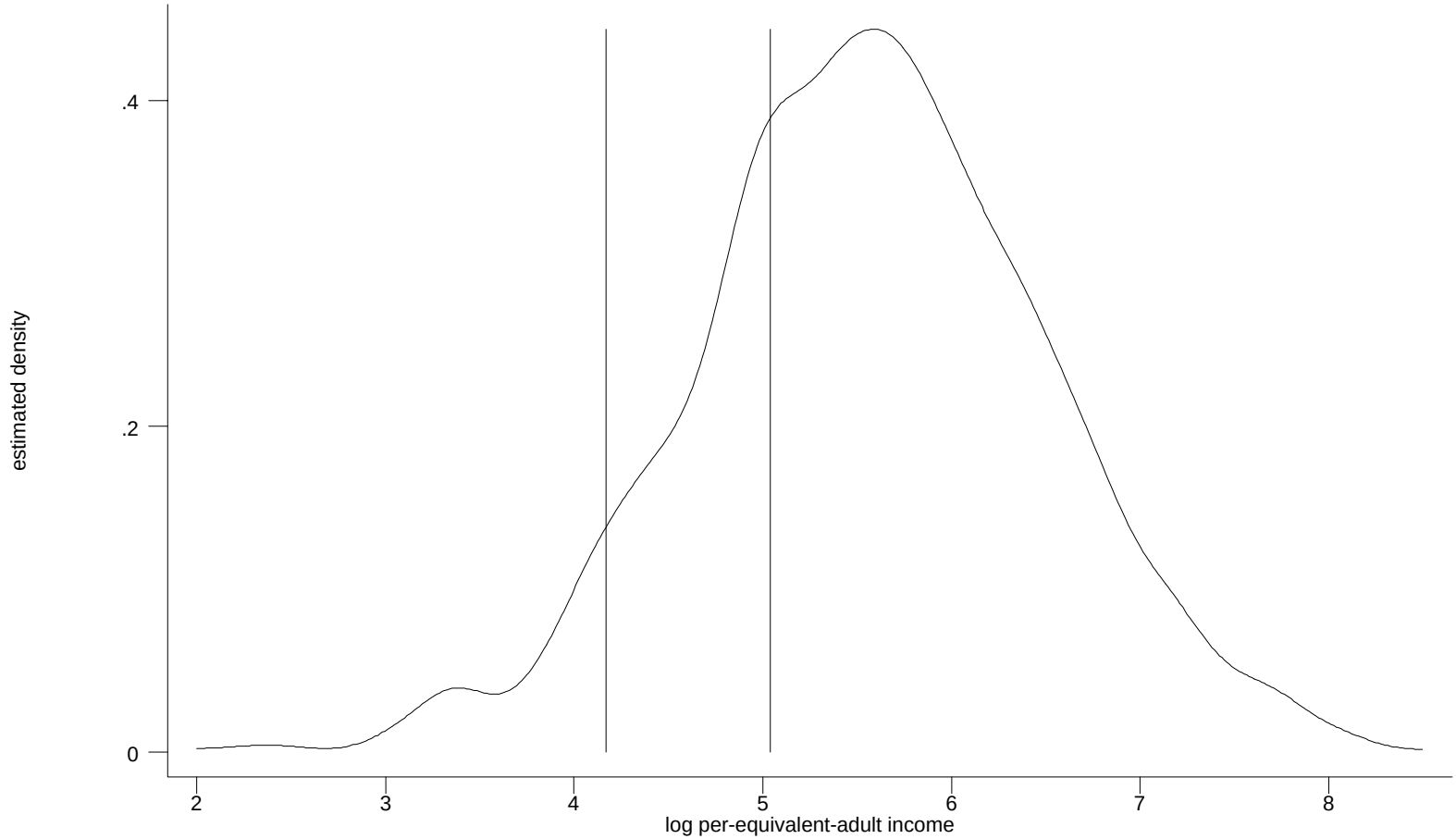

Table 1
Wage Price-Elasticities
Agro-Manufactures, Industrial-Manufactures
Imported Consumption Goods and Capital Goods

	Unskilled	**SemiSkilled**	**Skilled**
Prices			
Agro-Manufactures	**0.75**	**0.72**	**0.77**
	9.66	*8.49*	*6.67*
Industrial-Manufactures	**0.42**	**0.24**	**0.45**
	1.74	*0.99*	*1.19*
Imported	**-3.10**	**-2.53**	**-2.91**
Consumption Goods	*-10.70*	*-8.03*	*-6.35*
Capital Goods	**1.95**	**2.11**	**2.21**
	4.52	*4.71*	*3.51*
Trends	**0.02**	**0.03**	**0.05**
	5.28	*6.97*	*8.15*

Notes. Coefficients are in bold and robust t-statistics, in italics. I regress the log of wages on the log of the prices of agro-manufactures, industrial manufactures, imported consumption goods and imported capital goods. The regression includes also a trend interacted with education dummies (to capture technological chance), educational dummies, and inidividual controls such as age, age squared, marital status and gender dummies.

Table 2
Marginal Effecs of Trade Policies and the Scope for Trade Reforms
Trade Policies in Argentina and Developed Countries

	Exports		Imports	
	Agro Manufactures	Industrial Manufactures	Consumption Goods	Capital Goods
Scope For Reforms				
Argentina				
Common External Tariff	-	-	13.2	12.7
Intrazone Tariff	-	-	0.0	0.0
Rest of the World				
United States	6.4	6.9	-	-
European Union	21.3	6.4	-	-
Canada	18.1	11.0	-	-
Domestic Support	yes	yes		
Marginal Effects				
Shift in the Distribution				
fraction	-0.19	-0.10	-0.73	-0.49
total	6879	3612	26962	18119

Notes. The upper panel of the table reports the scope for trade reforms. It includes data on the average import tariff on consumption and capital goods and the average tariff on Argentine exports to developed countries. These averages include the ad-valorem in-quota tariffs, the equivalent out-of-quota tariffs and the equivalent specific tariffs. Data are from OECD (2000). The lower panel of the table shows the marginal effects of trade related events. These are the impacts on poverty of small changes (of one percent) in the prices of the different traded goods. For each of these marginal effects, I report the fraction and the total population affected.

Table 3
Estimated Change in International Prices
Agricultural Products

	CGE	Econometric Estimation
	(1)	(2)
Oils and Fats	2.2	8.7
Beef	10.4	17.3
Dairy Products	8.3	17.8
Beverages		14.7
Mills Products		17.4
Sugar	9.0	16.4
Average	7.5	15.4

Notes: percentage change in international prices caused by a reform that eliminates all tariff protection and all domestic support on agriculture in developed countries. (1) Beghin et.al. (2002); (2) Hoekman et.al. (2003)

Table 4
Poverty Effects of Trade Policies

	Total Population (1)	Population in Poverty (2)	Head Count Ratio (percentage) (3)	Change in the Number of Poor People (4)
Baseline				
October (1999)	3,691,532	947,570	25.7	
FOREIGN REFORMS				
Agro-Manufactures				
7.5% price increase		901,623	24.4	-45,947
15.4% price increase		861,077	23.3	-86,493
Industrial-Manufactures				
1.6% price increase		942,406	25.5	-5,164
7% price increase		924,190	25.0	-23,380
Total				
Lower Bound		897,479	24.3	-50,091
Upper Bound		840,429	22.8	-107,141
NATIONAL REFORMS				
Imported Consumption Goods				
2% price decrease		897,479	24.3	-50,091
8% price decrease		770,896	20.9	-176,674
Imported Capital Goods				
2% price decrease		979,577	26.5	32,007
8% price decrease		1,114,468	30.2	166,898
Total				
Lower Bound		928,187	25.1	-19,383
Upper Bound		886,238	24.0	-61,332
TOTAL REFORMS				
Lower Bound		887,235	24.0	-60,335
Upper Bound		778,033	21.1	-169,537

(1): refers to the total population represented in the sample
(2): refers to the number of people whose income is below is poverty line
(3): refers to the proportion of poor people over the total population
(4): difference between the number of poor people in October 1999 and the hypothetical number of poor people after the policy

Table A.1
Average Wages and Prices in Argentina: 1992 - 1999

	Wages			Prices				
	Unskilled	Semiskilled	Skilled	Agricultural Manufactures	Industrial Manufactures	Consumption Goods	Capital Goods	Sample Size
May 1992	5.906	6.224	6.524	97.3	102.7	100.6	100.8	3008
Oct 1992	6.010	6.339	6.703	98.3	104.3	101.4	103.3	3269
May 1993	6.038	6.343	6.759	98.9	97.8	98.1	100.7	3785
Oct 1993	6.082	6.402	6.851	103.1	101.0	99.5	100.1	3660
May 1994	6.096	6.414	6.923	103.1	101.8	101.2	99.3	3839
Oct 1994	6.111	6.476	6.906	101.4	105.3	103.4	101.4	3572
May 1995	6.033	6.461	6.897	103.0	111.9	103.1	101.4	3800
Oct 1995	5.991	6.441	6.940	103.1	115.5	108.9	100.7	3721
May 1996	5.975	6.449	6.886	104.6	109.6	107.9	98.9	3697
Oct 1996	5.909	6.398	6.981	110.0	109.5	108.4	97.3	3610
May 1997	5.927	6.392	6.945	106.3	108.7	108.8	96.7	3934
Oct 1997	5.938	6.425	6.978	110.7	108.4	108.6	92.6	3933
May 1998	5.953	6.421	7.030	104.2	107.4	108.2	93.4	4191
Oct 1998	5.920	6.451	6.990	100.1	104.2	105.6	92.1	4201
May 1999	5.880	6.357	6.951	88.1	94.9	102.9	90.9	4140
Oct 1999	5.868	6.344	6.923	80.1	93.0	99.0	86.3	4068

Source: Wage data are from the Permanent Household Survey (EPH). Prices are reported by the National Institute of Statistic and Census (INDEC). The data refer to the price index of the main categories of exports and imports in Argentina.