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Substitutability and Protectionism: Latin America's Trade Policy and Imports from China and India

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Substitutability and protectionism: Latin America's trade policy and imports from China and India*

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Abstract

This paper examines the trade policy response of Latin American governments to the rapid growth of China and India in world markets. To explain higher protection in sectors where a large share is imported from these countries, we extend the 'protection for sale' model to allow for different degrees of substitutability between domestically produced and imported varieties. The extension suggests that higher levels of protection towards Chinese goods can be explained by high substitutability between domestically produced goods and Chinese goods, whereas lower levels of protection towards goods imported from India can be explained by low substitutability with domestically produced goods. The data supports the extension to the 'protection for sale' model, which performs better than the original specification in terms of explaining Latin America's structure of protection.

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1 Introduction

China's and India's fast economic growth during the past decade is paralleled by their increased presence in policy discussions throughout Latin America. The success of the two Asian economies is not only looked upon with admiration, but is often accompanied by concerns about the effects that growing trade integration with China (and India to a lesser extent) has on the manufacturing sector throughout the region. Textiles, apparel, shoe manufacturing and toys are amongst the sectors worst hit by international competition.

In many Latin American countries requests for explicit protection are becoming more and more common. At the end of 2005, as Brazilian imports of textiles from China surged, Brazilian manufacturers officially asked their government to limit imports of Chinese silk, velvet and polyester thread by imposing import quotas and/or increasing tariffs. At the time, they also noted that an additional 70 Chinese products were being reviewed by the textile industry to determine whether similar protective measures are to be requested. A comuniqué by Argentina's Confederation of Medium Enterprises (CAME) calls for not repeating the "mistakes of the nineties, when an 'invasion' of Chinese products destroyed entire sectors of the manufacturing sector."[1]

Local politicians have not left these calls for help unanswered. After a recent meeting with its Chinese counterpart, the Brazilian Minister for Industry, Development and Commerce Luiz Furlan was quick to highlight that "I made it very clear to Minister Bo Xilai that we will take the legal steps to give Brazilian industry the right to protect itself".[2] In early 2006, and following the earlier demands of Brazilian textile manufacturers, Brazil and China signed an agreement under which China was to limit its export growth of 70 textile products to Brazil. Notwithstanding their country's privileged access to the US market, Mexican politicians show similar feelings and are growing more and more nervous about Mexico's burgeoning trade deficit with China. It is not surprising then that after a recent meeting with Chinese leaders, president Fox was very happy to report that "Today we heard from

[1]See CAME's comuniqué of November 16th 2004 at http://procom.org.ar/comunicado.php3?id=335.
[2]As reported by Yahoo! on October 4 2005. See http://sg.biz.yahoo.com/051004/1/3veny.htm.

President Hu his enthusiasm, his help, his support in closing the commercial gap...".[3]

While GATT-WTO bounds in principle do not allow countries to increase protection *vis à vis* China and India's products, most developing countries have bound tariffs well above their applied levels, a situation that de facto enables them to significantly increase protection without violating their GATT obligations.[4] Similarly, antidumping and safeguard rules are quite lax and these instruments have been often used by both developed and developing countries against Chinese imports (at least until China's accession to the WTO).[5]

Given the substantial degree of flexibility enjoyed by domestic policy makers in implementing trade policies within the WTO rules, we are interested in exploring whether the characterization of China and India as sources of "cheap" and "unfair" imports has led to increased protectionism on goods that are heavily imported from the two Asian economies.[6]

Our initial analysis indicates that this is indeed the case for Latin American imports from China. Controlling for time, country, and industry fixed effects and instrumenting the import share of China and India to account for potential reverse causality, we find that on average, tariffs and non tariff barriers tend to be higher for goods that are heavily imported from China. Goods imported from India, on the other hand, tend to face lower levels of protection than imports from the rest of the world. Among Latin American regions, this result holds for the Andean countries, the Southern Cone and Mexico, while in the case of Central America there is evidence of lower levels of protection on goods imported from both China and India.

Motivated by this first-pass empirical evidence, we turn to a more structural explanation of the differences in the levels of protection observed in goods imported heavily from China

[3]See "Mexico builds trade ties with China" by J.C. McKinley in The New York Times of September 19, 2005.

[4]For example, Brazil's bound tariff in textiles, apparel and footwear are bound at 35% in the WTO, and applied tariffs on these products have varied between 16 and 30 percent during the 1990s.

[5]See Hoekman and Kostecki (2001).

[6]Below are some common characterizations of China as a source of "cheap" and "unfair" imports: "Countries around the world are bracing for a surge of cheap imports from China, which benefits from cheap, union-free labor and rising productivity" Taipei Times, January 2nd 2005. "And a villain always helps. Our polling indicates that 31% of Americans see China as the country that ignores agreements and breaks rules the most often." Frank Lutz in *Republican Playbook*.

and India. Taking the 'protection for sale' model of Grossman and Helpman (1994) as a starting point, we develop an extended version that incorporates the Armington assumption by allowing for imperfect substitution between domestic and imported varieties of a good. In such a setup, trade policy applies only to the imported variety. However, via the degree of substitutability in consumption between the domestic and the imported variety, the level of protection also affects the equilibrium price of the domestic one. Explicitly taking into account this dependency, all pay-offs can be expressed in terms of the tariff. Solving the model, the degree of pass-through of trade policy into domestic prices, which in turn depends on the degree of substitutability between domestic and imported varieties, enters multiplicatively in the tariff equation of the extended model.

Our extension suggests that if Chinese exports are closer substitutes to domestically produced goods in Latin America than imports from the rest of the world, then one would observe higher protection levels on goods heavily imported from China. Similarly, if goods imported from India tended to be less substitutable with domestically produced goods, then we will observe lower levels of protection on goods heavily imported from India. The reason is that domestic lobbying forces are stronger on goods that are close substitutes to what is domestically produced. Our estimates confirm that China's imports are closer substitutes to domestically produced goods than imports from the rest of the world, whereas goods imported from India tend to be more distant substitutes to domestically produced goods.

This is consistent with the fact that Latin America's private sector and policy makers seem to be relatively more concerned about China's growing presence than India's imports.[7] Also recent estimates by Calderón (2006) suggests that the correlation of output between China and LAC is generally higher than for India and LAC. Moreover, 60 percent of the explained variation in these output correlation is attributed to time effects suggesting that China and LAC tend to be affected by similar exogenous shocks. This provides indirect evidence that China produces goods that are closer substitutes to LAC goods than the ones produced by India.

[7]A thorough search of the Latin American press between 2005 and 2006 reveals that China receives by far more attention than India.

We then estimate the extended model that accommodates for imperfect substitution between goods imported from different regions, and domestically produced goods, using the classic 'protection for sale model' (Grossman and Helpman, 1994) as a benchmark. The extended model performs better than the traditional 'protection for sale model' along two dimensions: first, it explains better the tariff structure of Latin America economies (in terms of R-squared and a non-nested specification J test); and second, the results are economically more reasonable. Indeed, the weight that the government puts on social welfare relative to industry lobbying is closer to what common sense suggests. In particular, in our sample of Latin American countries, governments' weight on industry lobbying is on average 32 percent of the weight governments attaches to social welfare; and is as high as 89 percent for Central American countries. This is in contrast to the traditional model estimates, where the weight governments put on industry lobbying represent less than 1 percent of the weight attached to social welfare.[8]

The imperfect substitutability of imported and domestic varieties in the context of the protection-for-sale model has been introduced first by Chang (2005). In this paper, the author develops a framework featuring Dixit-Stiglitz like differentiated goods sectors and analyzes the effects that this market structure has on the trade policy outcome of the lobbying game. As she correctly points out, her framework is ideally suited to study the intra-industry trade flows that dominate North-North trade.[9] In our theoretical model we instead stop short of such a change in the market structure, because we are interested in South-South and North-South trade. Furthermore, and more importantly, we want to allow for different elasticities of substitution vis-à-vis different source countries, a generalization that cannot be easily introduced in a Dixit-Stiglitz framework. For these reasons, we use a simpler, perfectly

[8] This is a well-known problem of the empirical literature on 'protection for sale' (see Gawande and Krishna, 2004 for a careful discussion). Similar results were obtained by Gawande and Bandyopadhyay (2000), and Goldberg and Maggi (1999) for the United States. McCalman (2004) found that industry lobbying accounts for 2 percent of the Australian government objective function and Mitra et al. (2002) found that industry lobbying accounts for 1 percent of the Turkish government's objective function. See also by Facchini et al. (2006) and Mitra et al. (2006).

[9] Chang and Lee (2005) allow for both monopolistically as well as perfectly competitive sectors when empirically implementing the Chang (2005) model.

competitive setup that, while foregoing the rent shifting effects of Chang's model, allows us to establish unambiguously the effect of the elasticity of substitution on trade policy.

The rest of the paper is organized as follows. Section 2 provides some *prima-facie* evidence regarding Latin American tariffs on goods heavily imported from China and India. In section 3 we develop the extension to Grossman and Helpman's (1994) "protection for sale" model. Section 4 presents the empirical methodology and results. Section 5 concludes.

2 Is LAC protection stronger against goods imported from China and India?

In order to answer this question we start by exploring the correlation between Latin America's structure of protection and the relative importance of China and India as a source of imports. This exercise is undertaken at the highest level of disaggregation that is possible for trade data to be internationally comparable: the six digit level of the Harmonized System. We consider the 1992-2004 period and the country coverage and data sources are discussed in the Data Appendix.

Latin America's overall average import-weighted tariff on world's imports is 13 percent. The import-weighted tariff on imports from China and India is 9 percent higher. The largest protectionist bias towards China and India is to be found in Central American and Andean countries with average levels of protection that are 66 and 26 percent higher, respectively, on imports from China and India than on imports from the rest of the world. But tariffs are only part of the story. Anti–dumping duties, quantitative restrictions and technical regulations have become an important and often more arbitrarily used instrument for trade protection. Latin America's import-weighted overall level of protection (i.e., including ad-valorem equivalents of non tariff barriers) on overall world's imports is 27 percent (Kee, Nicita and Olarreaga 2006), and on imports from China and India 10 percent higher. The largest protectionist bias against China and India, once we include ad-valorem equivalents of non tariff barriers, is to be found in the Southern Cone, with average levels of protection

20 percent higher on imports from China and India than on imports from the rest of the world.

But one has to be careful before interpreting these averages as evidence that imports from China and India lead to higher tariffs in Latin America. There are two important issues that need to be addressed before we can reach such a conclusion. First, the causal relation could well go in the opposite direction. In other words, higher tariffs may hit harder the less competitive trading partners, and this may lead to a growing share of imports from China and India. Secondly, our correlations might be affected by endogeneity bias, as the products in which China and India have a comparative advantage might be those in which Latin American countries have the highest protection because of internal political economy forces, that have little to do with imports from either China or India. For example, China and India are likely to have a comparative advantage in unskilled labor intensive industries, and these are the sectors which have the strongest political clout in Latin America.

We address the first problem by instrumenting the share of imports from China and India with their share in world trade by product, and the capital-labor ratio of the United States in each industry. The underlying assumption is that individual Latin American countries' tariffs are neither affecting the overall competitiveness of China and India in world markets, nor the capital-labor ratio of industries in the United States. We believe these to be relatively reasonable assumptions, as none of the Latin American countries in our sample represents more than 2 percent of world trade. We address the omitted variable problem by introducing country, year and 2 digits industry fixed effects. Doing so allows us to address, for instance, the possibility that China might have a comparative advantage in sectors that happen to be strongly protected in Latin America, to the extent that the forces for comparative advantage in China and India, and for protection in Latin America, do not vary (too much) within 2 digits industries.

Thus, the equation to be estimated takes the following form:

$$t_{k,c,t} = \beta_0 + \beta_I I_{k \in 2 \text{ digit},c,t} + \beta_m m_{k,c,t} + \beta_S s_{k,c\ ,t} + \mu_{k,c,t} \tag{1}$$

where $t_{k,c,t}$ is the level of protection on good k (at the six digit level of the Harmonized System) in country c at time t, $I_{k \in 2 \text{ digit},c,t}$ are a full set of product fixed effects (at the level of the 2 digit Harmonized system) that vary by country and year, $m_{k,c,t}$ are imports and $s_{k,c,t}$ is the share of imports that comes from China and India in sector k of country c at time t; $\mu_{k,c,t}$ is a mean zero error term. We use two specifications. In the first we include the overall share of imports from China and India, while in the second we introduce the share of imports from China and India separately.

The instrumental variable results are reported in Tables 1 and 2 for a pool of 10 Latin American countries, and four sub-regions: Andean countries (Bolivia, Colombia, Peru and Venezuela), Central America (Costa Rica and Nicaragua), Mexico, and the Southern Cone (Argentina, Brazil and Uruguay). Table 1 reports results using tariffs as the endogenous variable, and Table 2 reports results using ad-valorem equivalents of non tariff barriers as well. Because the ad-valorem equivalents are only available for the year 2001, there is no time variation in the results reported in Table 2.[10][11]

With the exception of Central America, tariffs throughout the region tend to be higher on goods imported from China and India. As it turns out though, this result is mainly driven by China. In fact, when we separately include the import shares of China and India in the regressions, the share of imports from China enters positively (with the exception of Central America again), and is statistically significant, whereas the share of imports from India is negative and statistically significant, suggesting lower tariffs on goods heavily imported from that country. Note, however, that the (positive) impact of China's import share is consistently substantially larger than the impact of India's import share. This result is likely to illustrate the relative importance of these two countries as a source of imports for Latin America, but it also indicates that the protectionist bias towards goods imported from China is much larger than the anti-protectionist bias towards goods imported from India.[12]

[10] All first-stage regressions are highly statistically significant with F-statistics agreater than 20 and p-values lower than 0.0001. The results of first-stage regressions are available upon request.

[11] For data sources and variable descriptions see the Data Appendix.

[12] We have also experimented estimating equation (1) controlling for the presence of preferential trade agreeements and for the accession of China as a WTO member. In the former case, we used fixed effects to

Does the pattern of higher protection applied to Chinese goods and lower protection applied to Indian goods hold when we consider non tariff barriers as well? The answer is positive and the results are reported in Table 2, where we use the same specification as in Table 1, but add to the six digit Harmonized System tariffs the ad-valorem equivalents of non tariff barriers obtained by Kee, Nicita and Olarreaga (2006).[13] The statistical significance of the estimates is not as high as for those in Table 1, but the same pattern is present. Note that we do not have results for Central American countries, because there are no estimates available for the trade restrictiveness of their non tariff barriers.[14]

In sum, sectors characterized by a larger share of imports from China tend to receive higher protection, while sectors characterized by a larger share of imports from India tend to face lower levels of protection. While we think that this evidence is per se important, to provide an explanation for these patterns we extend the Grossman and Helpman (1994) 'protection for sale' model to allow for imperfect substitution between domestically produced goods and imported goods. We then bring the extended model to the data.

3 Introducing imperfect substitution in the protection for sale model

To analyze the political economy consequences of increased commercial ties with emerging economies such as China and India, we consider a model in which a small open economy sets trade policy vis-a-vis imports from the rest of the world (ROW). The key hypothesis in our model is that goods are differentiated by location of origin, that is, we adopt the Armington assumption and regard imports and domestically produced varieties as imperfect substitutes.

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control for the presence of preferential agreeements. In the latter case, we have also used as an explanatory variable the interaction between the share of imports from China and a dummy variable which is equal to one after the year of 2000. The results described above remain intact and the regression results are available upon request.

[13]Note that these estimates only exist for the year 2001, so we lost the time dimension in our sample. Results reported in Table 2 are for the year 2001 only.

[14]The first-stage regressions used to compute the results in table 2 are in general highly statistically significant. The first-stage results are available upon reuqest.

Our model features $n+1$ different types of goods, and we allow each type to be produced either domestically or imported from abroad. Later on we will allow for three different types of imported goods, depending on whether they originate in India, China or elsewhere. The extension is straightforward and thus to simplify the presentation of the extended model we focus on a composite imported variety.[15]

Indicating by subscript k the type of good, consumers in the home country maximize the following quasi-linear utility function:

$$U = X_0 + \sum_{k=1}^{n} U_k(X_k) \tag{2}$$

where $U_k(.)$ are strictly concave subutility functions ($U_k = E_k \ln X_k$, that is, an upper tier Cobb-Douglas) that depend on a CES aggregate of the imported and domestic variety of the good, denoted with subscripts d and i respectively, i.e.

$$X_k = \left[x_{k,d}^{\rho_k} + x_{k,i}^{\rho_k}\right]^{\frac{1}{\rho_k}} \qquad\qquad 0 < \rho_k < 1 \tag{3}$$

where $x_{k,d}$ stands for the consumption of the domestic variety of good $k \in \{1, ..., n\}$, $x_{k,i}$ is the consumption of the imported variety, $\sigma_k = \frac{1}{1-\rho_k} > 1$ is the elasticity of substitution between the two varieties, and good zero is the numéraire. Note that quasi–linearity implies that there is neither an income nor a substitution effect for non-numéraire goods, as is standard in the protection for sale model.

The supply side is a specific-factor model where the primary inputs are sector-specific capital and mobile labor. Each individual in this economy is endowed with labor and at most one sector–specific input. The specifics of supply in each sector are summarized by profit functions $\pi_k(p_{k,d})$, where $p_{k,d}$ is the price of the domestic variety. To make things tractable, we are going to work with linear supply schedules, i.e. we will assume that the profit functions are quadratic. Production of good zero uses only labor under constant returns to scale, and by appropriate choice of unit its price as well as the wage rate are normalized to one.

[15]Different varieties in a protection for sale model under monopolistic competition have been analyzed by Chang (2005).

For an individual with income E the maximization of equation 2 subject to the budget constraint $E = X_0 + \sum_{k=1}^{n}(p_{k,d}x_{k,d} + p_{k,i}x_{k,i})$ yields the following demands for the domestic and imported varieties of each product:

$$x_{k,d}(p_{k,d}, p_{k,i}, E_k; \rho_k) = \frac{E_k p_{k,d}^{\frac{1}{\rho_k - 1}}}{p_{k,d}^{\frac{\rho_k}{\rho_k - 1}} + p_{k,i}^{\frac{\rho_k}{\rho_k - 1}}} \tag{4}$$

$$x_{k,i}(p_{k,d}, p_{k,i}, E_k; \rho_k) = \frac{E_k p_{k,i}^{\frac{1}{\rho_k - 1}}}{p_{k,d}^{\frac{\rho_k}{\rho_k - 1}} + p_{k,i}^{\frac{\rho_k}{\rho_k - 1}}} \tag{5}$$

where $p_{k,i} = p_k^* + t_k$ is the price of the imported variety that results as the sum of the exogenous world market price and the import tariff, and E_k is the expenditure on good k (see the parameter of the Cobb-Douglas above). Note that — in line with a substantial part of the literature and in view of the goal of this paper — we do not explicitly consider export policies.

The price of the domestic variety results from the interplay of domestic supply and domestic demand, where the latter varies not only with the price of the domestic variety but also with the price of the imported variety, and this relation depends on the degree of substitutability. In particular, setting demand equal supply in the market for the domestic variety, i.e. $x_{k,d}(p_{k,d}, p_{k,i}, E_k; \rho_k) = \pi'(p_{k,d})$, implicitly defines the equilibrium price of the domestic variety

$$p_{k,d} \equiv p_{k,d}(p_k^* + t_k; \rho_k) \tag{6}$$

as a function of the price of the imported variety, where the relationship depends on the elasticity of substitution. To obtain further insights into the relationship between the price of the domestic variety and the price of the imported variety, and on how it is influenced by the elasticity of substitution, we assume that the supply of the domestic variety takes the following linear form:

$$y_{k,d} = p_{k,d} \tag{7}$$

Setting supply equal demand in the market for the domestic variety then results in the following equilibrium condition:

$$p_{k,d} = \frac{E_k p_{k,d}^{\frac{1}{\rho_k - 1}}}{p_{k,d}^{\frac{\rho_k}{\rho_k - 1}} + p_{k,i}^{\frac{\rho_k}{\rho_k - 1}}} \tag{8}$$

Since we are unable to explicitly solve for $p_{k,d}$, we proceed by totally differentiating the equilibrium condition. Keeping in mind that the demand function is given by equation (4) above, we obtain

$$dp_{k,d} - \frac{\partial x_{k,d}}{\partial p_{k,d}} dp_{k,d} - \frac{\partial x_{k,d}}{\partial p_{k,i}} dp_{k,i} - \frac{\partial x_{k,d}}{\partial \rho_k} d\rho_k = 0 \tag{9}$$

We are interested in analyzing the relationship between the price of the domestic and foreign varieties, i.e. $\frac{dp_{k,d}}{dp_{k,i}}$. Holding ρ constant, equation (9) implies:

$$\frac{dp_{k,d}}{dp_{k,i}} = \frac{\frac{\partial x_{k,d}}{\partial p_{k,i}}}{1 - \frac{\partial x_{k,d}}{\partial p_{k,d}}} \tag{10}$$

where

$$\frac{\partial x_{k,d}}{\partial p_{k,i}} = -\frac{\frac{\rho_k}{\rho_k - 1} E_k (p_{k,d} p_{k,i})^{\frac{1}{\rho_k - 1}}}{[p_{k,d}^{\frac{\rho_k}{\rho_k - 1}} + p_{k,i}^{\frac{\rho_k}{\rho_k - 1}}]^2}, \tag{11}$$

and

$$\frac{\partial x_{k,d}}{\partial p_{k,d}} = \frac{E p_{k,d}^{\frac{2}{\rho_k - 1}} (1 - \rho_k + (p_{k,d}/p_{k,i})^{\frac{-\rho_k}{\rho_k - 1}})}{[p_{k,d}^{\frac{\rho_k}{\rho_k - 1}} + p_{k,i}^{\frac{\rho_k}{\rho_k - 1}}]^2 (\rho_k - 1)}, \tag{12}$$

It is easy to show that both the numerator and the denominator are positive, since $0 < \rho_k < 1$. We have thus established that $\frac{dp_{k,d}}{dp_{k,i}} \geq 0$, i.e. that the price of the domestic variety increases if the price of the imported variety does, for example because of an increase in the tariff.

How does a change in the substitutability between the two varieties affect the relationship between the price of the domestic and the imported varieties? First, consider two extreme cases at each end of the spectrum: If the elasticity of substitution between the domestic and the imported variety equals one ($\rho_k \to 0$), we are in the case of a Cobb-Douglas aggregator. In this case, the price of the domestic variety is unaffected, in other words $dp_{k,d}/dp_{k,i} = 0$. On the other hand, if the domestic and the imported varieties are perfect substitutes ($\rho_k \to 1$), a change in the price of the imported variety translates one-for-one ($dp_{k,d}/dp_{k,i} = 1$) into the price of the domestic variety. This puts us back in the standard framework of the Grossman-Helpman protection for sale model.[16]

To analyze intermediate cases and to show more formally that $dp_{k,d}/dp_{k,i}$ is increasing in ρ, we need to differentiate equation (10) with respect to ρ:

$$\frac{\partial(\frac{dp_{k,d}}{dp_{k,i}})}{\partial \rho_k} = \frac{\frac{\partial(\frac{\partial x_{k,d}}{\partial p_{k,i}})}{\partial \rho_k}(1 - \frac{\partial x_{k,d}}{\partial p_{k,d}}) + \frac{\partial x_{k,d}}{\partial p_{k,i}} \frac{\partial(\frac{\partial x_{k,d}}{\partial p_{k,d}})}{\partial \rho_k}}{(1 - \frac{\partial x_{k,d}}{\partial p_{k,d}})^2} \tag{13}$$

Solving explicitly, this can be shown to be positive under reasonable conditions (see the appendix). We can therefore conclude that $p'_k \equiv dp_{k,d}/dp_{k,i}$ is a positive function of ρ_k.

3.1 Lobbying Game

We model the lobbying game along the lines of Grossman and Helpman familiar protection for sale model, assuming for simplicity that all sectors are organized.[17] In the first stage, owners of sector specific capital in the home country lobby the government for advantageous trade policies on imported substitutes. In particular, they offer contribution schedules $C_k(\mathbf{t})$ that depend on the full vector of import tariffs. Each individual enjoys a consumer surplus $CS(\mathbf{t}) = \sum_k [U_k(X_k(p_{k,d}, p_{k,i})) - p_{k,d}(p_k^* + t_k)x_{k,d} - (p_k^* + t_k)x_{k,i}]$ and receives also a lump sum transfer from the government representing a share of the total tariff revenues $TR(\mathbf{t}) = \sum_k t_k x_{k,i}(p_{k,d}(p_k^* + t_k), p_k^* + t_k)$, that are rebated to the public on an equal, per capita basis.

[16] If both varieties were complementary ($\rho_k < 0$) then we would obtain a negative correlation between the two prices, a case we do not consider as we are modeling two varieties of the same good.

[17] For a similar approach, see Grossman and Helpman (1995) and Mitra et al. (2006).

Note that both these components depend on the price of the domestic variety and we have made use of expression (6) to express them in terms of tariffs.

Assuming that the ownership of the specific factor is highly concentrated in the population, and in particular that the factor owners represent a negligible fraction of the total population, the objective function of each organized group can be approximated by

$$W_k(\mathbf{t}) = l_k + \pi_k(\mathbf{t}) \tag{14}$$

where l_k is the total labor supply (and also labor income) of the owners of the specific input used in industry k. In the second stage, each government chooses trade policy and collects the contributions that were offered. Formally, it seeks to maximize the following objective function:

$$G(\mathbf{t}) = \sum_k C_k(\mathbf{t}) + aW(\mathbf{t}) \tag{15}$$

where $\mathbf{t}$ is the vector of tariffs applied by the Home country and a is the weight the government puts on social welfare in its objective function. $W(\mathbf{t})$ denotes the aggregate social welfare function, which is defined as follows:

$$W(\mathbf{t}) = L + \sum_k \pi_k(\mathbf{t}) + CS(\mathbf{t}) + TR(\mathbf{t}) \tag{16}$$

where L denotes the labor force (hence labor income because $w = 1$).

Because we do not have information on political organization by sector in Latin America (i.e., there is no legal requirement for public disclosure of industries' political contributions), when solving for the optimal tariff we will assume that all industries are organized (which is not unreasonable given the high level of industry aggregation in our data), and that contribution functions are differentiable (i.e. locally truthful).

Taking the first order condition of the government's maximization problem in (16), and rearranging we obtain:

$$\frac{t_k^0}{1+t_k^0} = \frac{1}{a} \times \frac{z_k}{\epsilon_k} \times p_k' \tag{17}$$

where $t_k^0 \equiv t_k/p_{k,i}$ is the ad valorem tariff, $z_k \equiv x_{k,d}/x_{k,i}$ is the inverse import penetration ratio, and ϵ_k is the total price elasticity of import demand that consists of the direct price effect and the cross-price effect due to the tariff's impact on the domestic price.[18] The last term is the main innovation vis-à-vis the standard model (p_k' is given by equation (10)). We have shown above that it depends positively on the elasticity of substitution. Thus in the presence of high substitution between domestically produced goods and imported goods, tariffs are likely to be higher.

4 Empirical Analysis

To assess the ability of our model to explain the patterns of protection towards Chinese and Indian imports we have highlighted in our preliminary data analysis, we proceed in two steps. First, we estimate the elasticity of substitution between the domestically produced variety of a given good and the varieties respectively imported from China, India and the rest of the world. For our model to be compatible with the data, the estimated elasticity of substitution between domestically produced and Chinese produced varieties should be higher than the elasticity of substitution between the domestic variety and the variety imported from the rest of the world. The opposite should hold for the Indian imported varieties.

Next, we compare the performance of our model against the standard Grossman and Helpman benchmark. If product heterogeneity is important, we expect our model to fit better the data than the standard benchmark.

[18] Formally, $\epsilon_k = \epsilon_{k,i} + \epsilon_{k,d}\epsilon_{p,k} = \frac{\partial x_{k,i}}{\partial p_{k,i}}\frac{p_{k,i}}{x_{k,i}} + \frac{\partial x_{k,i}}{\partial p_{k,d}}\frac{p_{k,d}}{x_{k,i}} \times \frac{\partial p_{k,d}}{\partial p_{k,i}}\frac{p_{k,i}}{p_{k,d}}$.

4.1 Estimating the substitutability between domestically produced goods and imports from China and India

We follow the strategy described in Sato (1967) to estimate the substitutability between imported varieties of good k and the domestically produced good k. Denote imports of good k form China, India and the rest of the world respectively by $x_{k,C}$, $x_{k,I}$, and $x_{k,ROW}$. Assume as in Sato (1967) that import varieties can be aggregated using a CES function:

$$x_{k,i} = \left[\sum_j \phi_j x_{k,j}^{\gamma_k} \right]^{\frac{1}{\gamma_k}} \tag{18}$$

where $\phi_j > 0$, $x_{k,j}$ represents imports of good k from country $j \; \epsilon \; \{C, \; I, \; ROW\}$, and $\sigma_{k,i}$ $= \frac{1}{1-\gamma_k}$ denotes the elasticity of substitution among imported varieties of good k. With this nested CES preference structure Sato (1967) worked out the relationship between $\sigma_{k,i}$, σ_k, and the elasticity of substitution between the domestically produced variety of good k and the variety of good k imported from region j, that we will denote by $\sigma_{k,j}$. The relationship is given by:

$$\frac{\left(\frac{1}{\theta_{k,j}} - \frac{1}{\theta_{k,i}}\right) + \left(\frac{1}{\theta_{k,d}} - \frac{1}{\theta_{k,i}}\right)}{\sigma_{k,j}} = \frac{\left(\frac{1}{\theta_{k,j}} - \frac{1}{\theta_{k,i}}\right)}{\sigma_{k,i}} + \frac{\left(\frac{1}{\theta_{k,d}} + \frac{1}{\theta_{k,i}}\right)}{\sigma_k} \quad \text{for } j \; \epsilon \; \{C, \; I, \; ROW\} \tag{19}$$

where $\theta_{k,j}$ is the share of total expenditure on the imported variety of good k from region j, $\theta_{k,i}$ is the share of total expenditure on imports of that good (i.e., $\theta_{k,i} = \sum_j \theta_{k,j}$), and $\theta_{k,d}$ is the share of total expenditure on the domestic variety of good k.

Using equation (5) we can derive the price elasticity of the composite of imported goods, ϵ_k. Solving for σ_k we have $\sigma_k = -\epsilon_k$. Thus, with an estimate of the price elasticity of the imported composite good k that can be borrowed from the existing literature, we can derive an estimate for σ_k. With data on σ_k and on the share of expenditure on domestic and on imported varieties we can use the relationship described in equation (19) to obtain estimates for the degree of substitutability between domestically produced goods and respectively imports from China, India and the rest of the world.[19]

Before bringing equation (19) to the data, notice that the shares of expenditure on domestic and imported varieties appear in the left and right-hand sides of expression (19). Therefore, we need to rearrange the expression to be able to estimate the parameters of interest. As a result, the equation to be estimated becomes:

$$\frac{1}{\sigma} = \alpha_{1,j} \frac{\left(\frac{1}{\theta_{k,d}} - \frac{1}{\theta_{k,i}}\right)}{\left(\frac{1}{\theta_{k,d}} + \frac{1}{\theta_{k,i}}\right)} + \alpha_{2,j} \frac{\left(\frac{1}{\theta_{k,j}} - \frac{1}{\theta_{k,i}}\right)}{\left(\frac{1}{\theta_{k,d}} + \frac{1}{\theta_{k,i}}\right)} + \varepsilon_k \text{ for } j \in \{C,\ I,\ ROW\} \tag{20}$$

where $\alpha_{1,j} = \frac{1}{\sigma_j}$ and $\alpha_{2,j} = \left(\frac{1}{\sigma_i} - \frac{1}{\sigma_j}\right)$ are the parameters of interest, while ε_k is a zero mean error term that captures measurement errors in the dependent variable. σ_j can be estimated by calculating $1/\alpha_{1,j}$. Expression (20) is the basis for our estimation of the relative degrees of substitutability between the domestically produced and the goods imported from different regions. Results are discussed in subsection 4.3.

4.2 Does the extended model perform better?

In order to assess whether the extended model with imperfect substitution between domestically produced goods and imported goods performs better than the traditional 'protection for sale' model with homogeneous goods, we will run both models on our sample of Latin American countries: the extended model provided by equation (17) and the traditional model where the last term in equation (17) is not present. We will then explore which of the two models better explains Latin America's tariff structure by comparing the R-squared of the two regressions and by applying Davidson and MacKinnon (1981) non-nested J-test.[20]

[19] Note though that in our empirical analysis we will only be able to capture the average degree of substitutability σ_C, σ_I, and σ_{ROW}, as we have too few observations to estimate sector specific elasticities.

[20] This consists of running the two specifications, taking the predicted value of each specification and adding the predicted of the alternative specification to the null specification. If the predicted value is statistically significant, then we cannot reject that the alternative is the right specification. The problem with this test is that we may not be able to reject either of the alternatives, or we may be able to reject both, i.e., the test may be inconclusive.

We will also assess the two specifications in terms of their economic significance. One problem with the empirical literature on the 'protection for sale' model is that the estimates obtained for a, the parameter describing the weight attached by the government to aggregate welfare, are unreasonably high (see Gawande and Krishna, 2004 for a survey of the empirical literature). According to the existing estimates of the traditional 'protection for sale' model with homogeneous goods, the weight attached by the government on industry lobbying when setting trade policy represents less than 1 percent of the weight the government puts on social welfare. This is hardly consistent with observed behavior and tariff structures. If we were to obtain a lower, and more reasonable estimate for a when bringing our extended model to the data, we would have evidence suggesting that our framework is also economically more meaningful.

Note that in order to estimate the extended model, we need an estimate for p'_k, the derivative of domestic prices with respect to the price of the composite imported good, which we have defined in (10). Substituting in (10) the derivative of domestic demand with respect to the price of the domestic (equation 11) and of the foreign variety (equation 12), we obtain the following

$$p'_k = \frac{dp_{k,d}}{dp_{k,i}} = \frac{-\frac{\frac{\rho_k}{\rho_k-1} E_k (p_{k,d} p_{k,i})^{\frac{1}{\rho_k-1}}}{[p_{k,d}^{\frac{\rho_k}{\rho_k-1}} + p_{k,i}^{\frac{\rho_k}{\rho_k-1}}]^2}}{1 - \frac{E p_{k,d}^{\frac{2}{\rho_k-1}} (1-\rho_k+(p_{k,d} p_{k,i})^{\frac{-\rho_k}{\rho_k-1}})}{[p_{k,d}^{\frac{\rho_k}{\rho_k-1}} + p_{k,i}^{\frac{\rho_k}{\rho_k-1}}]^2 (\rho_k-1)}} \tag{21}$$

To be able to estimate p'_k, we need data on the prices of the domestic and the composite imported good, as well as consumer expenditure in sector k. The relative price between the domestic good and the composite imported good is obtained using the two first order conditions of the consumer maximization problem. More precisely, we take the ratio between (4) and (5) and solve for the relative price. The quasi-linear structure of the theoretical framework implies that there are neither income nor substitution effects for non-numeraire goods. Thus, the model allows us to assume that the price of the imported good in every sector is equal to one. Consumption is readily obtained from trade and production data.[21] We use then equations (4) and (5) to calculate the price of the domestic varieties. One concern we have when constructing p'_k in this fashion is measurement error, but we instrument the term p'_k jointly with the rest of the right hand side term to address this problem.

Finally, a well-known problem with the estimation of the 'protection for sale' model in its traditional or extended form is the endogeneity of the right-hand-side variables. In order to correct for this we use as instruments China and India's share in world trade by product, and the capital-labor ratio of the United States in each industry. The results of the estimation of the extended and traditional 'protection for sale model' as well as the first-stage regressions are discussed in the next section (4.3).

4.3 Results

We start by discussing the results of the estimation of the degree of substitutability between domestically produced goods and varieties that are imported from either China, India or the rest of the world. We estimate equation (20) using data on imports from China, India, and rest of the world separately. Parameter estimates obtained for equation (20), as well as the implied σ's are reported in Table 3. A quick look suggests that the degree of substitution between Chinese goods and goods produced domestically in Latin America – as measured by σ_C – is higher than the degree of substitution between goods imported from the rest of the world and domestically produced goods – as measured by σ_{ROW} – using data on the entire sample of Latin American countries, on Andean countries and Southern cone countries. The estimates for σ_C is numerically and statistically larger than the estimates for σ_{ROW}, with the exception of Mexico and Central America. The results for σ_I are statistically different from zero in all regions, with the exception of Central America. However, the comparison between σ_{ROW} and σ_I does not generate a clear result, and in some cases the difference between these parameters is not statistically different from zero.

Table 4 provides the results of the estimation of (17) and the traditional 'protection for

[21] Or rather apparent consumption which equals imports plus domestic production minus exports.

sale model' for the entire pooled sample and the four sub-regions. Results for the pooled sample, and for the Southern Cone always have the expected positive sign on the coefficient of the GH term and of the extended GH term. For Andean countries, Central America, and Mexico the coefficient is negative when using the traditional GH specification, which is at odds with theory. This coefficient is instead positive for the extended GH specification, a result that is consistent with our theoretical predictions. In fact, in all cases the extended GH coefficient has the expected sign and is statistically different from zero.

Our results also suggest that the extended GH model performs better in terms of R-squared, suggesting that the extended model, that allows for imperfect substitutability between domestic and imported varieties, fits better the data. The Davidson-McKinnon non-nested J test for model specification indicates that the extended GH model dominates the model with homogenous goods using either the pooled sample or the data by sub-regions.

As it can be seen from (17) the coefficient in front of the GH term (both in its traditional and extended form) is given by $1/a$, i.e., the inverse of the weight the government puts on social welfare relative to industry lobbying when setting trade policy. In the case of the extended GH model we obtain estimates for this parameter that are all positive (as expected) and statistically different from zero.

More interestingly, the estimates for the weight the governments put on welfare relative to industry lobbying are more realistic than the figures obtained in the existing literature. In fact, for the extended GH model, they oscillate between 1 and 5, rather than ranging from negative to between 900 and 1600 (or even negative) as in the traditional GH model. Allowing for imperfect substitution between domestically produced goods and imported goods thus provides one possible solution to the puzzle of large estimates of a. In fact, the results from the traditional GH model would suggest that the relative weight the government puts on industry lobbying is around 0.1 percent of the weight put on social welfare for the pooled LAC sample ($0.001 = 1/[a = 918]$)). If this were the case, assuming no other market imperfections, it would be very difficult to explain the high levels of trade protection that can be observed in Latin America. On the other hand, the estimates from the extended

GH model suggest that the weight attached by the government on industry lobbying is 32 percent of the weight it puts on social welfare ($0.32 = 1/([a = 3.16])$), suggesting a much larger scope for lobbies' influence. Governments with the least concern for social welfare are to be found in Central America (where a is estimated at 1.12), and the governments with the highest concern for social welfare are to be found among Andean countries with an average a estimated at 4.73.[22]

Table 5 shows the first-stage regression results which were used to obtain the results displayed in table 4. The F-statistics indicate that the instrumental variables used to estimate the traditional GH model are statistically significant for the pooled sample, for the Andean and for the Mercosur countries, and for Mexico. There is no evidence that the instrumental variables are suitable in estimating the traditional GH model for Central American countries. The F-test indicates that the instrumental variables are jointly significant for the pooled sample and for all sub-region when estimating the extended GH model. In most cases, the F-statistics is greater than 10 in the extended GH model's first stage regressions. Since we have a single endogenous regressor, these results reinforce our belief in the appropriateness of the instrumental variables used to estimated the extended GH model.[23]

5 Conclusion

The growing presence of China and India in world markets and as a source for Latin American imports has caught policy makers attention. This paper explores the response of Latin American policy-makers to growing imports from China and India in their markets. We found that sectors in which the share of imports from China is growing, generally tend to have higher tariffs, controlling for reverse causality and industry, year and country effects.

[22]We also estimate (17) and the traditional 'protection for sale model' using the overall level of protection that includes ad-valorem equivalents of non tariff barriers as the left hand side variable. Results for the pooled sample suggest that the parameter a equals 898 in the case of the traditional GH model, and is equal to 2.17 in the case of the extended GH model. However none of the estimates of the traditional GH model are statistically different from zero (although they are different from each other). In the case of the extended GH model, the estimates for the pooled sample as well as for Mercosur countries are statistically significant and have the expected sign. The results for the other sub-regions are not statistically significant.

[23]This observation follows from the "rule of thumb" suggested by Staiger and Stock (1997).

The reverse pattern is observed in sectors where India's presence is growing.

In order to explain this evidence, we develop an extension to the Grossman and Helpman (1994) 'protection for sale' model to allow for imperfect substitution between domestically produced goods and goods imported from different regions. The model suggest that as the elasticity of substitution between domestically produced goods and imported goods increases, the incentives to lobby also increase, and the resulting equilibrium tariff is higher.

Our analysis has been carried out in two steps. First, we have studied the substitutability of domestically produced goods with imports from either China, India or the rest of the world. We have found that Chinese imports are on average closer substitutes to goods domestically produced in Latin America countries than goods originating in the rest of the world, while the opposite is true for goods originating in India. Next, we have brought our extended protection for sale framework to the data. We have shown that it outperforms the traditional Grossman Helpman framework in two respects. First of all, it fits better the data. Secondly, and even more interestingly, explicitly modeling imperfect substitutability between domestic and imported varieties allows us to obtain substantially more realistic structural parameter estimates than the ones obtained using an homogenous good specification.

A possible explanation for this result is that by ignoring the imperfect substitutability between imported and domestically produced goods the existing literature is obtaining estimates for the weight attached by the government to aggregate welfare that are upward biased. In fact, by assuming that imported goods and domestic varieties are perfect substitutes, we would be led to conclude that the large variation observed in the political economy term of the Grossman Helpman model (z_k/ϵ_k) translates into a relatively small variation in the level of protection because of the large weight attached by the government to aggregate welfare. If we instead allow for our more general setting, the reason for which the government does not react is not that it cares mainly about social welfare, but rather that there is no lobbying pressure when imported goods are very imperfect substitutes for domestically produced goods.

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Appendix

There are two parts to this appendix. First, we calculate the derivative of the domestic prices with respect to the degree of substitutability between domestically produced goods and imported goods. Second, we describe the data used in our analysis.

Derivative of p'_k with respect to ρ_k

Differentiating (21) with respect to ρ_k, setting all international prices equal to 1, and denoting $p_k = p_{k,d}/p_{k,i}$ as the relative price of domestic to imported goods yields:

$$\begin{aligned}
\frac{\partial p'_k}{\partial \rho_k} &= E_k p_k^{\frac{\rho_k+1}{\rho_k-1}} \Bigg[\left(E_k p_k^{\frac{2}{\rho_k-1}} + p_k^{\frac{2\rho_k}{\rho_k-1}}\right)(\rho_k - 1) - p_k^{\frac{\rho_k}{\rho_k-1}} \Bigg(E_k p_k^{\frac{2}{\rho_k-1}} \\
&+ \left. 2p_k^{\frac{2\rho_k}{\rho_k-1}}\right)(1 - \rho_k + \rho_k \log(p_k)) + p_k^{\frac{\rho_k}{\rho_k-1}}(\rho_k - 1 + \rho_k \log(p_k))\Bigg] \\
/ & \Bigg[p_k^{\frac{3\rho_k}{\rho_k-1}}(\rho_k - 1) - E_k p_k^{\frac{2}{\rho_k-1}} + 2p_k^{\frac{2\rho_k}{\rho_k-1}}(\rho_k - 1) \\
&+ \left. p_k^{\frac{\rho_k}{\rho_k-1}}\left(E_k p_k^{\frac{2}{\rho_k-1}} + 1\right)(\rho_k - 1)\right]^2 (\rho_k - 1) \qquad (22)
\end{aligned}$$

Rearranging, it can be shown that a sufficient condition for the right hand side of (22) to be positive is $|\log(p_k)| = |\log(p_{k,d}) - \log(p_{k,i})| < (1 - \rho_k)/\rho_k$. Intuitively, this condition requires that the more substitutable are the domestic and the foreign varieties, the stronger must be the cross price effect than the own price effect.

Data Appendix

There are 10 Latin American countries in our sample (Argentina, Bolivia, Brazil, Colombia, Costa Rica, Guatemala, Mexico, Peru, Uruguay, Venezuela), which represent more than 90 percent of Latin America's GDP. Results are either reported for the whole pooled sample or for four sub-regional samples: Andean (Bolivia, Colombia, Peru and Venezuela), Central America (Costa Rica and Guatemala), Mexico, and the Southern Cone (Argentina, Brazil and Uruguay).

The countries in the sample are those for which we have data available on tariffs, trade, output, and elasticities of import demand during the period 1992-2004, all of which are needed to estimate (17).[24]

Trade data comes from United Nations Comtrade, the output data comes from Unido, and tariff data from UNCTAD's TRAINS. For a discussion of data availability see Nicita and Olarreaga (2006). Data ad-valorem equivalents of non tariff barriers comes from Kee, Nicita and Olarreaga (2006). The elasticities of import demand are borrowed from Kee, Nicita and Olarreaga (2004).

Table A provides some summary statistics of levels of protection *vis-à-vis* the world and *vis-à-vis* China and India for LAC and each of the sub-regions considered in the paper. The first column provides the import-weighted MFN tariffs in 2001, and the second column the marginal increase in protection *vis-à-vis* China and India (i.e., using imports from China and India as weights). The third and fourth column provide similar statistics but using the overall level of protection in 2001, that is including the AVEs of non tariff barriers in Kee, Nicita and Olarreaga (2006). Thus, in Latin America, the import-weighted tariff on imports from the world is 13 percent. The import-weighted tariff on imports from China and India is 9 percent higher. Similarly, the import-weighted overall level of protection (i.e., including ad-valorem equivalents of non tariff barriers) on imports from the world is 27 percent, and on imports from China and India 10 percent higher.

[24] We also had data for Chile, but because it has has a uniform tariff structure, there is little to explain. We therefore decided to drop Chile from our sample.

Table A: Average Levels of protection *vis-à-vis* the world, and China and India in 2001.[a]

	Tariffs, 2001		Overall level of protection, 2001	
	World	China & India	World	China & India
Andean countries	11	+26%	23	-4%
Central America	5	+66%	NA	NA
Mexico	11	+13%	24	+9%
Southern Cone	15	+9%	30	+19%
Latin America	13	+9%	27	+10%

[a]All averages are import-weighted. For China and India, we provide the change in protection with respect to the MFN levels in percentages.

Table 1: Tariffs in LAC and imports from China and India[a]

	Latin America		Andean countries		Central America		Mexico		Southern Cone	
Total imports	0.14 **	0.94 **	0.1 **	4.0 **	-0.2 **	-0.2 **	0.01 **	0.02 **	0.07 **	0.08 **
$(m_{k,c,t})$	(0.01)	(0.01)	(0.02)	(0.09)	(0.05)	(0.06)	(0.00)	(0.00)	(0.01)	(0.02)
Share of imports from China & India	0.8 **		0.25 **		-2.28**		0.59 **		0.4 **	
$(s_{k,c \text{ from C\&I},t})$	(0.04)		(0.03)		(0.09)		(0.08)		(0.04)	
Share of imports from China		4.52 **		6.45 **		-2.7 **		1.12 **		3.8 **
$(s_{k,c \text{ from C},t})$		(0.05)		(0.16)		(0.11)		(0.09)		(0.08)
Share of imports from India		-0.05 **		-0.13 **		-0.43		-0.21 **		-0.1 **
$(s_{k,c \text{ from I},t})$		(0.01)		(0.02)		(0.25)		(0.05)		(0.02)
R-squared	0.55	0.57	0.67	0.68	0.65	0.65	0.56	0.57	0.63	0.64
# observations	247822	247822	101010	101010	34215	34215	22676	22676	89921	89921
# countries	10	10	4	4	2	2	1	1	3	3

[a] Regressions are estimated using an instrumental variable approach, where all variables are instrumented. Instruments are the shares of China and India in world markets, and the US capital-labor ratio. All regressions include dummies that vary be 2 digit HS sector, year and country. White robust standard errors are reported in parenthesis. ⋆⋆ stands for statistical significance at the 1 percent level, and ⋆ for statistical significance at the 5 percent level.

Table 2: Overall levels of protection in LAC and imports from China and India[a]

	Latin America		Andean countries		Central America		Mexico		Southern Cone	
Total imports	0.0 ⋆⋆	0.0 ⋆⋆	0.0	0.0	NA	NA	0.0 ⋆⋆	0.0 ⋆⋆	0.0	0.0
($m_{k,c,t}$)	(0.0)	(0.0)	(0.0)	(0.0)			(0.0)	(0.0)	(0.0)	(0.0)
Share of imports from China & India	0.4 ⋆⋆		0.4		NA		4.3 ⋆⋆		0.2	
($s_{k,c \text{ from C\&I},t}$)	(0.1)		(0.3)				(0.7)		(0.3)	
Share of imports from China		0.5 ⋆⋆		0.3		NA		4.5 ⋆⋆		0.1
($s_{k,c \text{ from C},t}$)		(0.07)		(0.3)				(0.7)		(0.4)
Share of imports from India		-0.3 ⋆⋆		0.2		NA		-0.9		-0.2 ⋆
($s_{k,c \text{ from I},t}$)		(0.12)		(0.2)				(0.6)		(0.1)
R-squared	0.16	0.17	0.25	0.25			0.21	0.18	0.14	0.15
# observations	22542	22542	7887	7887			3945	3945	11833	11833
# countries	10	10	4	4	0	0	1	1	3	3

[a] Regressions are estimated using an instrumental variable approach, where all variables are instrumented. Instruments are the US capital-labor ratio and the shares of China and India in world markets. All regressions include dummies that vary be 2 digit HS sector and country. White robust standard errors are reported in parenthesis. ⋆⋆ stands for statistical significance at the 1 percent level, and ⋆ for statistical significance at the 5 percent level.

Table 3: Estimating the degree of substitutability with domestically produced goods[a]

	Latin America	Andean Countries	Central America	Mexico	Southern Cone
$\alpha_{1,ROW}$	0.091**	0.087**	0.031**	0.165*	0.115**
(Rest of the world)	(0.009)	(0.014)	(0.023)	(0.055)	(0.016)
σ_{ROW}	10.989**	11.507**	32.573	6.064*	8.673**
(Rest of the world)	(1.079)	(1.842)	(24.346)	(2.033)	(1.179)
$\alpha_{1,C}$	0.073**	0.066**	0.021	0.143*	0.104**
(China)	(0.007)	(0.010)	(0.014)	(0.047)	(0.013)
σ_C	13.698**	15.174**	47.847	6.978*	9.588**
(China)	(1.353)	(2.33)	(31.212)	(2.319)	(1.193)
$\alpha_{1,I}$	0.088**	0.104**	0.016	0.068*	0.125**
(India)	(0.007)	(0.011)	(0.015)	(0.034)	(0.014)
σ_I	11.363**	9.569**	64.102	14.706*	7.974**
(India)	(0.899)	(0.995)	(63.471)	(7.307)	(0.888)
R-squares	[0.14, 0.19]	[0.08, 0.21]	[0.01,0.03]	[0.10,0.15]	[0.16,0.18]
Number of observations	[1499,1899]	[419,603]	[114,162]	[116,130]	[637,753]
Number of countries	10	4	2	1	3

[a]All regressions use country-fixed effects. White robust standard errors are provided in parentheses, both for the coefficients and the implied substitution parameters. $\star\star$ stands for statistical significance at the 1 percent level and $\star$ stands for statistical significance at the 5 percent level. The table provides the range of R-squares and number of observations of the regressions using data on imports from China, India and the rest of the of the world.

Table 4: Estimating the classic and extended Grossman-Helpman (GH) model.[a]

	Latin America		Andean countries		Central America		Mexico		Southern Cone	
GH term	0.001 ⋆⋆		-0.003 ⋆⋆		-0.002		0.002		0.0006⋆⋆	
$(z_{k,c,t}/\epsilon_{k,c,t})$	(0.0)		(0.001)		(0.006)		(0.003)		(0.0001)	
Implied a	918 ⋆⋆		-293 ⋆⋆		-363		-337		1639⋆⋆	
(weight on welfare)	(94.65)		(75.70)		(246.99)		(405.70)		(37.41)	
Extended GH term		0.32⋆⋆		0.21⋆⋆		0.89⋆⋆		0.28⋆⋆		0.32⋆⋆
$(z_{k,c,t}p'/\epsilon_{k,c,t})$		(0.02)		(0.02)		(0.11)		(0.10)		(0.09)
Extended implied a		3.16⋆⋆		4.73⋆⋆		1.12⋆⋆		3.59⋆⋆		3.14⋆⋆
(weight on welfare)		(0.20)		(0.46)		(0.14)		(1.27)		(0.41)
R-squared	0.21	0.29	0.29	0.40	0.09	0.34	0.10	0.17	0.20	0.28
# observations	1374	1374	532	532	155	155	100	100	587	587
# countries	10	10	4	4	2	2	1	1	3	3
J-non nested test[b]	Ext-GH		Ext-GH		Ext-GH		Ext-GH		Ext-GH	

[a] Regressions are estimated using an instrumental variable approach, where the GH terms are instrumented using the United States capital labor ratio in that industry, and China and India's shares in world trade by product. All regressions include country and year dummies. White robust standard errors are reported in parenthesis. ⋆⋆ stands for statistical significance at the 1 percent level, and ⋆ for statistical significance at the 5 percent level.

[b] Davidson-McKinnon (1981) J non-nested test for model specification. "Incl." stands for inconclusive; none of the models dominates the other at the 1 percent level. "GH" stands for the traditional GH model dominating the extended model at the 5 percent level, and "Ext-GH" stands for the extended GH model dominating the traditional GH model at the 5 percent level.

Table 5: First-Stage Results.[a]

	Latin America		Andean countries		Central America		Mexico		Southern Cone	
	GH	Ext-GH	GH	Ext-GH	GH	Ext-GH	GH	Ext-GH	GH	Ext-GH
US K/L	0.00 ⋆⋆	0.00 ⋆⋆	0.00**	0.00 **	-0.00	0.00	0.00	0.00	0.00 *	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
China's world share	218.67 ⋆⋆	1.02 ⋆⋆	17.61	1.17 **	-25.42	0.51 *	-2.00	0.77	600.74 ⋆⋆	1.08 **
	(70.66)	(0.14)	(14.00)	(0.24)	(38.78)	(0.27)	(23.30)	(0.62)	(143.98)	(0.23)
India's world share	-739.48 **	0.96 ⋆⋆	-104.97 **	1.20	-211.40	0.80	-206. 90 ⋆⋆	-2.20	-1570.25 **	1.04
	(166.42)	(0.44)	(34.52)	(0.67)	(148.08)	(0.90)	(80.11)	(1.84)	(364.83)	(0.73)
Constant	4.52 *	0.04 ⋆⋆	7.00 **	0.02 **	4.72 **	0.02	7.94 ⋆⋆	0.15 ⋆⋆	3.02	0.06 **
	(2.08)	(0.01)	(1.22)	(0.01)	(1.41)	(0.01)	(2.08)	(0.05)	(4.24)	(4.38)
F	7.07 ⋆⋆	38.57 ⋆⋆	4.58 ⋆⋆	14.24 ⋆⋆	2.25	3.08 *	2.98 *	2.14	6.33 ⋆⋆	23.04 ⋆⋆
# observations	1374	1374	532	532	155	155	100	100	587	587
# countries	10	10	4	4	2	2	1	1	3	3

[a] White robust standard errors are reported in parenthesis. ⋆⋆ stands for statistical significance at the 1 percent level, and ⋆ for statistical significance at the 5 percent level.