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THE GREAT RECESSION AND THE DETERMINANTS OF TARIFF AND ANTIDUMPING RESTRICTIONS IN ARGENTINA, BRAZIL AND MEXICO: A RETROSPECTIVE STUDY*

ABSTRACT

During the Great Recession (GR) several Latin American economies were active users of trade policies measures. However, their protectionist response is frequently seen as an instrument to attain other goals rather than those related to overcome the GR. This paper explores what is behind countries' conduct and summarizes the macro and microeconomic determinants of tariff and antidumping (AD) barriers in Argentina, Brazil and Mexico using pre- and post-2008 GR trade and protection data. As to tariff barriers, institutional agreements appear to have kept applied tariff in control after the crisis, while the positive impact of intra-industry trade reveals the governmental dependence on tariff revenue in both Sud-American countries. As to AD determinants, the evidence indicates that Argentina have further increased AD investigations after the crisis as a complement to tariff. Finally, the GR has not reinforced the relationship between movements in the exchange rate and the start of an AD procedure.

Keywords: Trade, Trade Policy, Trade Barriers, Antidumping

JEL Classification: F13

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RIASSUNTO

La grande recessione e le determinanti delle restrizioni tariffarie e antidumping in Argentina, Brasile e Messico: un'analisi retrospettiva

Durante la grande recessione (GR) molte economie dell'America latina hanno applicato misure di politica commerciale. In realtà la loro risposta protezionistica è stata frequentemente vista come uno strumento per ottenere risultati diversi da quelli inerenti il superamento della GR. Questo studio esamina cosa vi è dietro la condotta di questi paesi e riassume le determinanti macro- e microeconomiche delle barriere tariffarie e antidumping (AD) in Argentina, Brasile e Messico utilizzando i dati relativi al commercio ed alle misure protezionistiche pre- e post- la GR del 2008. Per quanto riguarda le barriere tariffarie gli accordi istituzionali sembrano aver tenuto sotto controllo le tariffe dopo la crisi, mentre l'impatto positivo del commercio intra-industriale dimostra la dipendenza governativa dalle rimesse delle tariffe in entrambi i paesi sudamericani. In riferimento poi alle determinanti dell'AD, vi sono evidenze che l'Argentina ha ulteriormente incrementato le investigazioni AD dopo la crisi come misura complementare alle tariffe. Infine, la GR non ha rinforzato la relazione tra i movimenti nei tassi di cambio e l'inizio di una procedura AD.

1. INTRODUCTION

Following the onset of the financial crisis in September 2008 and the subsequent “Great Trade Collapse” (Baldwin, 2009), several countries used trade policy instruments as part of their response to the Great Recession (GR). While according to Hoekman (2012) there was not a large-scale resort to protectionism as in the Great Depression, during the GR several Latin American economies were “active” users of these instruments and trade barriers enacted by Argentina, Brazil and, to a lesser extent, Mexico, have been shown to be particularly significant¹.

Although some of these trade barriers are probably dismantled, a walk through 2008-2010 shows that Argentine trade barriers have become less and less about industries traditionally targeted by these measures — such as steel — and more and more about restrictions on Chinese exports in a variety of industries (Moore, 2011). Interestingly, the acceleration of Brazil trade barriers

¹ As Kee *et al.* (2010) also point out, policy as a protectionist device has not been seen to play a substantial role in the global collapse of trade, neither as a cause nor a consequence. Nevertheless, anecdotal evidence suggests that some countries were actively tinkering with their trade policies.

during the crisis appears to be somewhat uncorrelated with the performance of the Brazilian real economy (which according to the official statistics continued to grow), but probably related to an appreciation of the real with respect to the currency of Brazil's trading partners. As to Mexico, antidumping (AD) measures remain concentrated on two countries, USA and China, although the Mexican economy has diversified its trade over the last decade. In this case, while different countries have increased their share in Mexican trade, their role in Mexico's larger AD picture has remained small (Robertson, 2011).

The protectionist response of these economies during the GR is like a puzzle and disentangling the underlying determinants of trade policy measures is an interesting exercise that helps stakeholders to better understand the political economy of trade policy in that time (Bown, 2011). To our knowledge, there is no empirical evidence on: (a) the effectiveness of bound rate commitments behind countries' conduct during the crisis; (b) the significance of Intra-Industry Trade (IIT) as a source of public revenues via trade restrictions; (c) the relevance of global chains in dissuading governments for enacting trade measures on intermediate inputs; and (d) the relationship – if any – between currency movements and AD initiations.

Following Jacobo and Jalile (2013), this paper aims at addressing these questions. It summarizes the determinants of trade policy in Argentina and Brazil, and it extends the analysis to Mexico during the GR. The study also verifies if countries had changed their behaviour as a consequence of the 2008 financial crisis. For this purpose, it explores the determinants of Tariff Barriers and AD over the period 2002-2010 which covers the peak of the crisis.

As known, there is a vast theoretical and empirical literature analysing the determinants of trade protection in the economy. In recent decades, however, this literature has moved towards the “endogenous” trade policy determination and has constituted the core of the literature on the political economy of trade policy (Gawande and Krishna 2008). Following this literature, we use 6-digit Harmonized System (HS) tariff, non-tariff and trade data provided by World Integrated Trade Solution (WITS), Temporary Trade Barriers (TTB) and Global Trade Alert (GTA) databases. The level of disaggregated data allows us to consider sectoral and partner countries differences that influence on trade protectionism. This strategy is not a novel one. Among other authors Olarreaga and Vaillant (2011) and Gawande *et al.* (2011) have already analysed the determinants of trade policies using disaggregated data as we do. However, in comparison with

the previous literature, we focus specifically on Argentina and Brazil, we add Mexico to the analysis, and we try to see if there is a change in the behaviour of these countries after the crisis with available data.

The rest of the paper is organized as follows. Section 2 provides some information about trade structure of the three countries together with a brief description of the stock of discriminatory measures used by Latin American Countries (LAC). Section 3 develops a simple model in which the presence of discriminatory policies such as tariff and AD in a particular sector from a specific country depends on macro and microeconomic determinants. Section 4 reports the results. Section 5 concludes.

2. TRADE STRUCTURE AND PROTECTIONIST POLICY IN LAC: AN OVERVIEW

Argentina, Brazil and Mexico are the most important LAC in terms production, trade flows and trade-barriers.

As to trade flows, according to the Observatory of Economic Complexity (OEC), Mexico is the 9th largest economy in the world, followed by Brazil (the 22nd) and Argentina (45th). These three economies interchanged goods and services with the world for U.S. \$ 1,258.7 B.

In fact, at the end of 2017, Mexico exported US\$ 418B and imported US\$ 356B. The information about its trade structure shows that the top exports of Mexico are Cars (11%), Vehicle Parts (7%), Delivery Trucks (6.4%), Computers (5.4%) and Crude Petroleum (4.7%). Mexican top imports are Vehicle Parts (7%), Refined Petroleum (6.6%), Cars (3.3%), Computers (2.8%) and Petroleum Gas (2.1%)².

Brazil exported US\$ 219B and imported US\$ 140B. The top exports of Brazil consist of Soybeans (11.8%), Iron Ore (9.2%), Crude Petroleum (8%), Raw Sugar (5.25%) and Cars (3.1%). Brazilian main imports are Refined Petroleum (8.14%), Vehicle Parts (3.6%), Packaged Medicaments (2.2%), Integrated Circuits (2.2%) and Cars (2.1%).

The third country under analysis, Argentina, exported US\$ 59.2B and imported US\$ 66.5B. Its exports are mainly Soybean Meal (15.5%), Corn (6.8%), Soybean Oil (6.6%), Delivery Trucks

² See OEC for further details: <https://oec.world/en/>.

(5.5%) and Soybeans (4.8%). Argentina imported Cars (9.5%), Vehicle Parts (4.2%), Telephones (3.4%), Petroleum Gas (3.2%) and Refined Petroleum (3.2%).

This trade structure panorama can be completed with the export destinations and import origins of each country which helps us to know the main partner in each case.

As Figure 2.1 indicates, the top export destinations of Mexico are the United States (which absorbs almost 73% of Mexican exports), Canada, China, Germany and Japan. In the case of Brazil, the main export destinations are different, and they are not concentrated as in the case of Mexico. China buys 22% of Brazilian exports, followed by the United States, Argentina, the Netherlands and Germany. Something similar occurs with the destinations of Argentinean exports: only 16% of total exports goes to Brazil (its main trade partner) whereas the rest is delivered mainly to the United States, China, Chile and Vietnam.

FIGURE 2.1 - *Top Export Destination of Mexico, Brazil and Argentina*

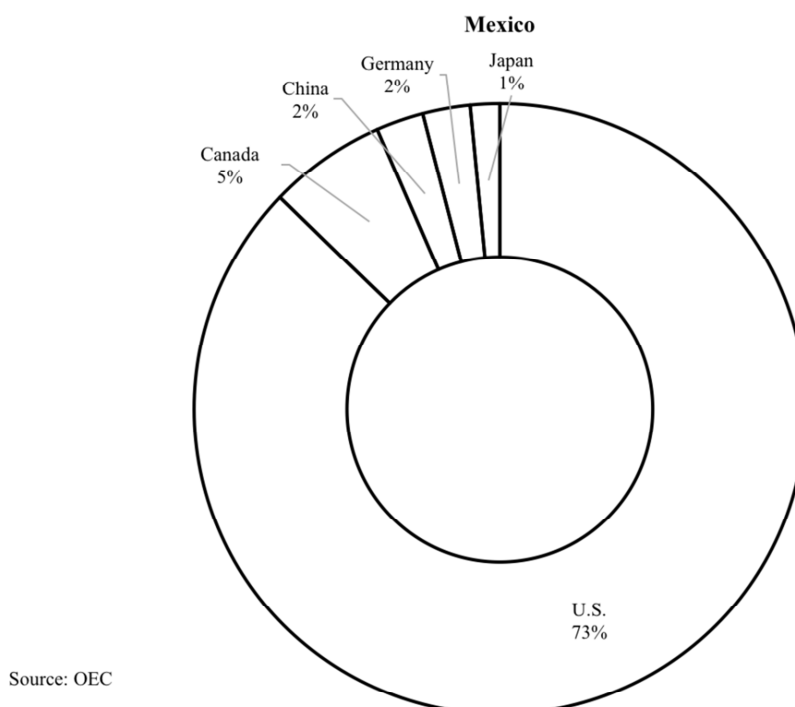
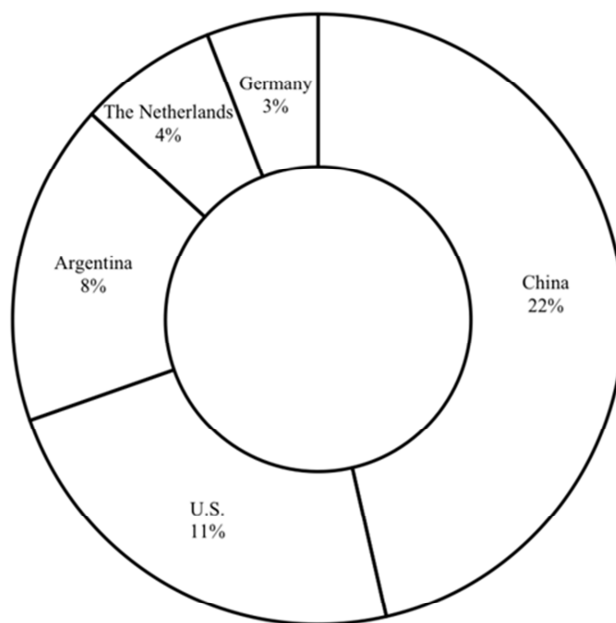
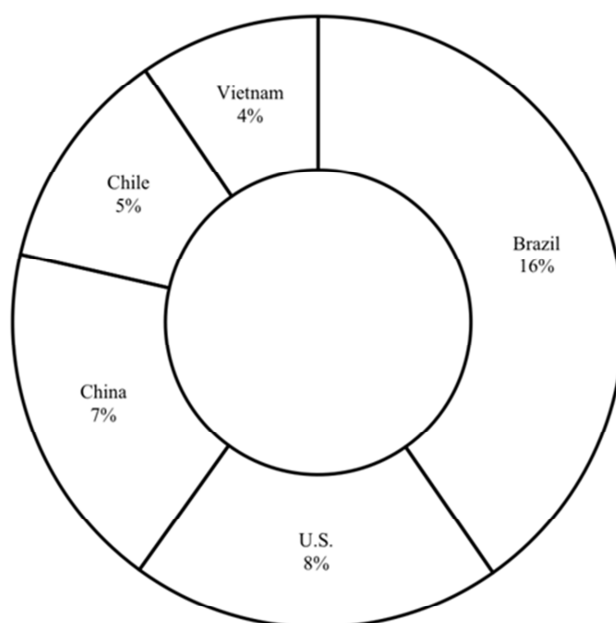


FIGURE 2.1 - *continued***Brazil**

Source: OEC

Argentina

Source: OEC

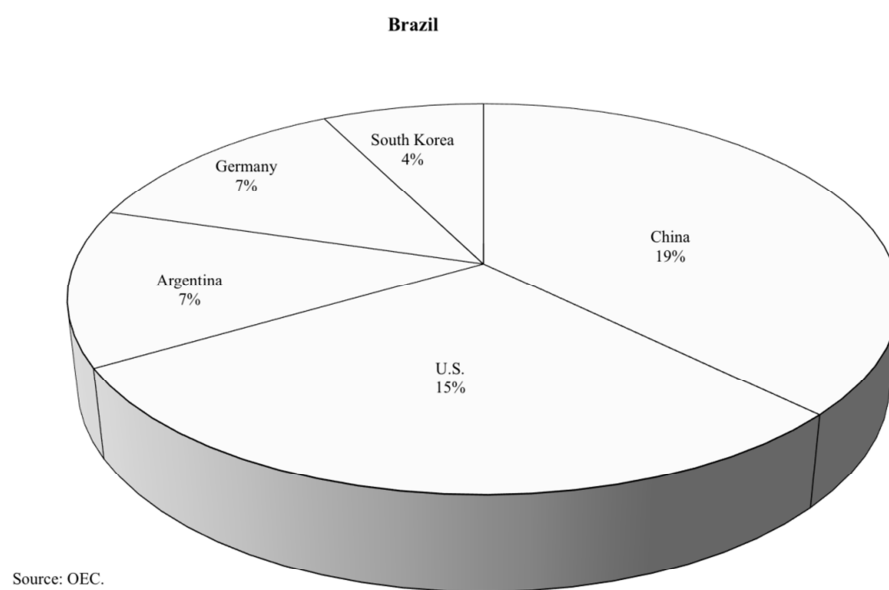
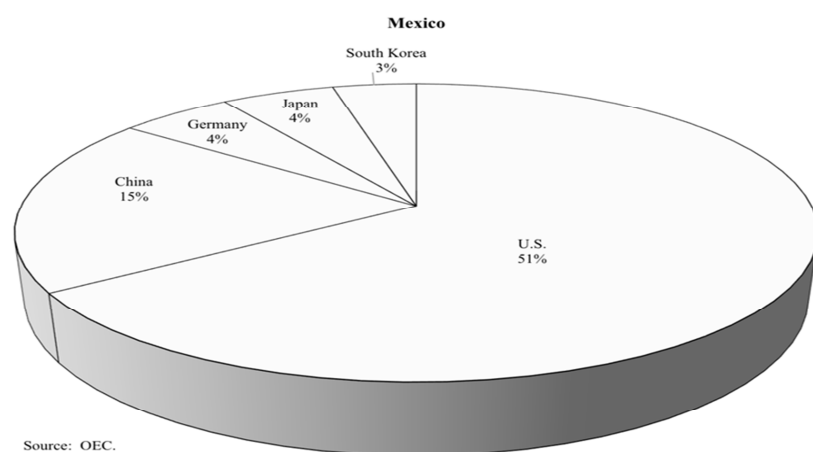
FIGURE 2.2 - *Top Import Origins of Mexico, Brazil and Argentina*

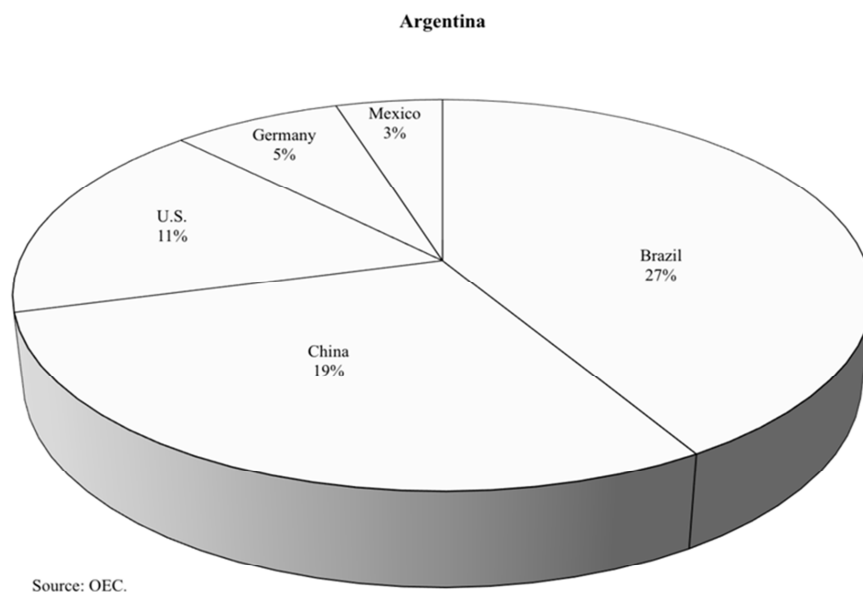
FIGURE 2.2 – *continued*

Figure 2.2 shows the import origins of traded goods. As to Mexico, the top import origins are the United States (51% of Mexican imports are provided by this country), China, Germany, Japan and South Korea. In the case of Brazil, the most important origins are China (which provides 19% of Brazilian imports), the United States, Argentina, Germany and South Korea. The main origins of Argentine imports are Brazil (which supplies 27% of Argentine total imports), China, the United States, Germany and Mexico.

As to trade barriers, several studies have carefully documented new measures that discriminate against foreign products activated in world trade since the GR. The 7th Global Trade Alert Report (GTA-7), for example, illustrates that Latin American governments did seek to use protectionist policy instruments at that time to respond to the crisis and that unilateral discriminatory measures mushroomed after the outbreak of the recession³.

To cope with the global crisis, major economies implemented a trading scheme and subsidies, cheap access to credit and other tax deductions and exemptions for exporters helped the recovery in world trade (Evenett, 2010). However, mainly due to the lack of resources, other

³ See Managed Exports and the Recovery of World Trade: The 7th Global Trade Alert Report (2010).

economies were unable to generate these stimulus packages and they used protectionist instruments. As to LAC, while some of them used tariff measures to protect one or more sectors affected by the global crisis, other economies started to assemble a trade policy pattern notably characterized by major movements in non-tariffs barriers as well (Dalle and Lavopa, 2010).

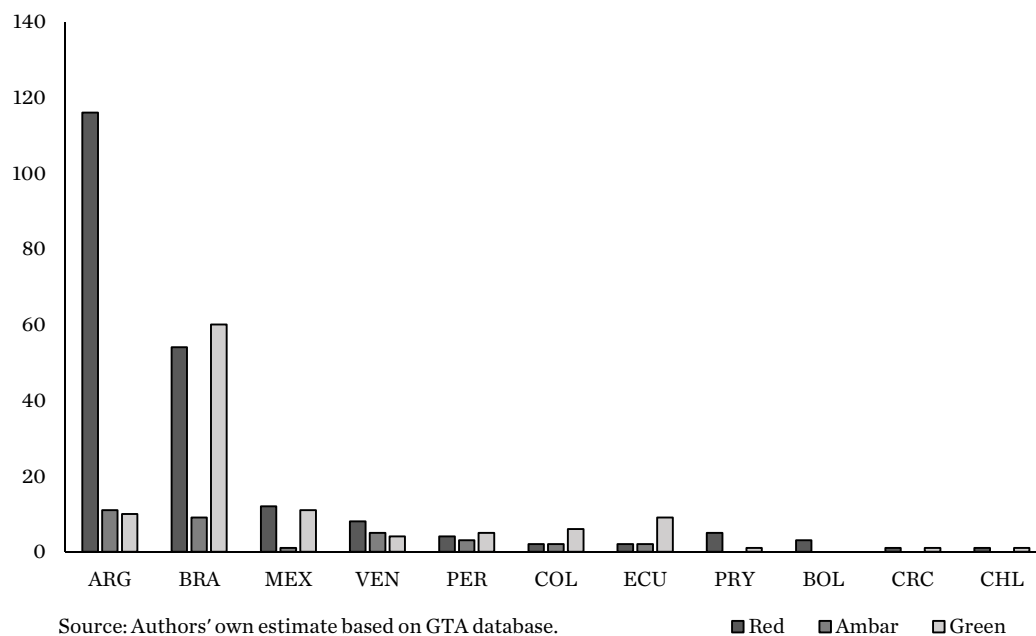
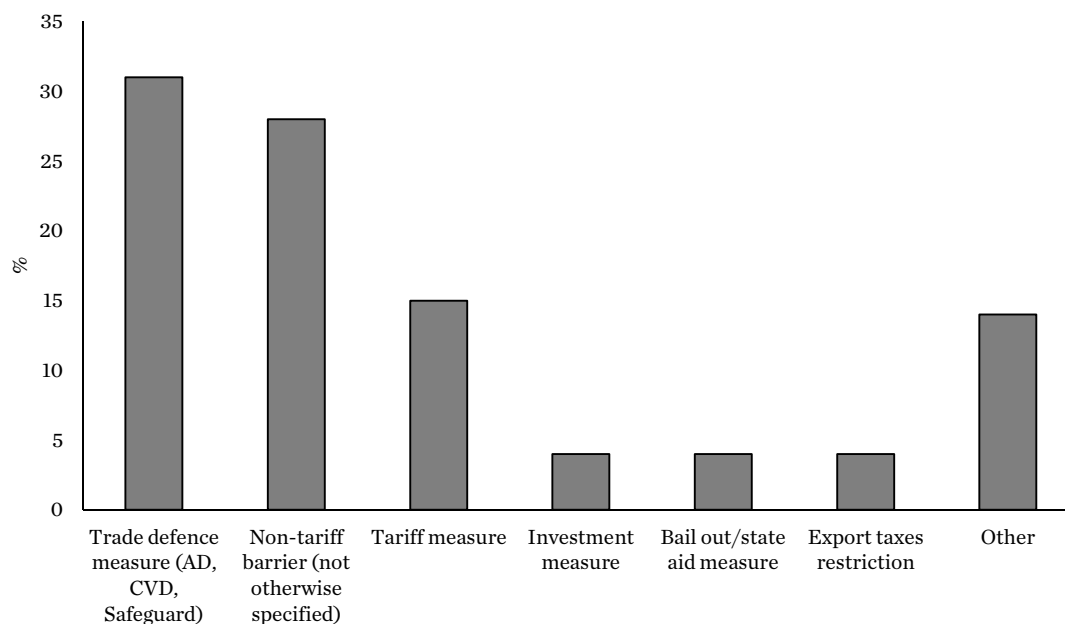
For illustrative purposes on trade barriers, we present information on protectionist measures imposed by 10 LAC⁴. The countries included are the three under analysis, i.e. Argentina (ARG), Brazil (BRA) and Mexico (MEX), plus Bolivia (BOL), Chile (CHL), Colombia (COL), Costa Rica (CRC), Ecuador (ECU), Paraguay (PRY), Peru (PER) and Venezuela (VEN)⁵. Figure 2.3 distinguishes green, amber or red measures implemented by each country. As shown in the figure, Argentina leads the ranking with the application of red and amber measures (127 in total), followed by Brazil (63) and Mexico (13).

Finally, Figure 2.4 shows the stock of red and amber measures implemented in LAC by type of measure. Trade defense measures (AD, countervailing duties (CVD) and safeguard) represent 30% of all red and amber measures, followed by non-tariff measures (28%) and tariff measures (15%)⁶.

⁴ We follow Jacobo and Jalile (2012) and use GTA database.

⁵ Although GTA database considers 27 Latin America economies, not all the countries have started to be monitored at the same time and/or have implemented measures, and therefore were not included in our analysis. See Jacobo and Jalile (2012) for further details.

⁶ "Other Measures" include, *inter alia*, the following ones: Consumption subsidy, Import subsidy, Competitive devaluation, Sanitary and Phytosanitary Measure, State-controlled company, Technical Barrier to Trade, Local content requirement, Trade finance and Export subsidy.

FIGURE 2.3 - *Number of Measures Implemented by LAC according to GTA Classification*FIGURE 2.4 - *Red and Amber Measures Implemented by LAC (by type of measure)*

To sum up, a simple tour shows us that Argentina, Brazil and Mexico, the most important LAC in terms of production and trade, were active users of measures that discriminate against commercial interest of other countries. This attitude is frequently seen as an instrument to attain other goals rather than those related to overcome the GR. In other words, and as previously said, this protectionist response is like a puzzle. Thus, to disentangle the underlying determinants of protectionist response of these economies during the crisis deserves an exercise as the one performed in Section 3 below. This contributes to better understand the political economy of trade policy at that time.

3. MODEL SPECIFICATION AND DATA

We firstly estimate a *Tariff Barrier* equation where the dependent variable is the *Effectively Applied Tariff* defined as the lowest available tariff. If a preferential tariff exists, we use it as the effectively applied tariff; otherwise we use the Most Favoured Nation (MFN) applied tariff. In this equation, we include the usual macro- and micro-economic determinants (Gawande *et al.* 2011; Olarreaga and Vaillant 2011)⁷. The equation is as follows:

$$t_{g,p,t} = \alpha_1 (tbndprf_{g,p,t}) + \alpha_2 (iit_{g,p,t-1}) + \alpha_3 (VS_g) + \alpha_4 (VSI_g) + \alpha_g + \alpha_p + \alpha_t + \varepsilon_{g,p,t} \quad (3.1)$$

where $t_{g,p,t}$ represents the level of the *Effectively Applied Tariff* on good g , imported from partner p at time t ; $tbndprf_{g,p,t}$ is a composite measure of $tbnd$ and $tprf$ ($tbnd$ is the bound rate commitment at the WTO and $tprf$ is the preferential tariff rate) and represents the value of this variable on good g imported from partner p at time t ; $iit_{g,p,t-1}$ is a measure of intra-industry trade on good g imported from partner p at time $t-1$; VS_g and VSI_g are measures of vertical specialization on product g ; α_g is an HS six-digit fixed effect; α_p is a partner fixed effect; and α_t is a time fixed effect.

The coefficient associated to the bound rate $tbndprf(\alpha_1)$ measures influence of institutions. As known, countries make commitments in terms of the “ceiling” above which they promise not to raise their applied duty but do not in terms of “applied protection”. However, if a country decides to sign a Preferential Trade Agreement (PTA) the new effective bound on its tariff rate would be the preferential tariff rate ($tprf$). Following Gawande *et al.* (2011), the study defines a

⁷ Gawande and Krishna (2008) provide a short and accurate review of the literature.

composite measure where $tbndprf = tprf$ whenever $tprf$ is applicable, or $tbndprf = tbnd$ otherwise. The coefficient is expected to be positive and small if the structure of GATT/WTO incentives keep applied tariff in check.

The coefficient α_2 captures the impact of IIT on the tariff barrier level. If tariffs in the countries are strategic as a source of government revenue one may expect a positive correlation between IIT and the dependent variable (Gawande *et al.*, 2011).

Vertical Specialization could be defined as production arrangements in which firms make final goods via multiple stages located in several countries. The literature points out that vertical specialization could have an impact on the tariff level. The study introduces two measures of vertical specialization: VS and VS1 (Hanson *et al.*, 2003). VS is the share of imports in a sector that is used directly and indirectly in the country's own exports (i.e. embedded as intermediate inputs). VS1 is the share of a sector's exports used as intermediates by exporters in other countries. These two variables have been constructed in Daudin *et al.*, (2011) using trade and input-output data from the Global Trade Analysis Project (GTAP) database and we use them following the methodology suggested by Jacobo and Jalile (2015)⁸. While a positive coefficient in VS may indicate that the exporters are not powerful enough to overcome the governmental decision to raise revenues, a negative coefficient on VS1 can be interpreted as a global supply chain working against protectionism.

Other macroeconomic determinants of policy trade responses that may vary across years such as the level of activity, unemployment and institutional variables have been taken into account with the use of year fixed effects (Olarreaga and Vaillant, 2011). The microeconomic determinants of trade policy instruments such as the concentrations of sectors, output or the extent to which workers are unionised remain constant during the period and our study controls them using product fixed effects.

Secondly, we estimate an *AD* equation where the dependent variable is the *Antidumping Initiation*. With regard to this equation, the determinants of Non-Tariff Barriers have also been extensively studied in the literature (Aggarwal 2004; Knetter and Prusa 2003; Prusa and Skeath 2002; Sabry 2000). We propose the following equation:

⁸ As in Jacobo and Jalile (2012), Daudin generously provided us with the data.

$$AD_{g,p,t} = \alpha_1 (uv_{g,p,t}) + \alpha_2 (m_{g,p,t}) + \alpha_3 (VS_g) + \alpha_4 (VSI_g) + \alpha_5 (t_{g,p,t}) + \alpha_6 (RBER_{p,t}) + \alpha_g + \alpha_p + \alpha_t + \varepsilon_{g,p,t} \quad (3.2)$$

where $AD_{g,p,t}$ is a dummy variable indicating the presence of an *Antidumping Initiation* on good g imported from partner p at time t ; $uv_{g,p,t}$ is the unit value of good g imported from partner p at time t ; $m_{g,p,t}$ is the value of imports of good g imported from partner p at time t ; $t_{g,p,t}$ is the effectively applied tariff on good g at time t ; VS_g and VSI_g are measures of vertical specialization on product g ; $RBER_{p,t}$ is the real bilateral exchange rate with respect to partner's p currency at time t ; α_g is an HS six-digit fixed effect; α_p is a partner fixed effect; and α_t is a time fixed effect.

As microeconomic determinants that affect trade policy responses we consider the price and the value of imports which vary across partners, years and sectors. We postulate that the propensity to initiate an AD procedure would increase with larger imports ($\alpha_2 > 0$) and it is less likely to be found with higher unit prices ($\alpha_1 < 0$).

We include the vertical specialization (VS and VSI) measures. One expects that an increase in vertical specialization reduce protectionism in the reporting country whether local governments favour global supply chains. This means that AD initiations should be inversely related with vertical specialization measures. On the other hand, a positive coefficient on VS could be associated with the fact that exporters in the reporting countries are not powerful enough for fight against protectionism, while a positive coefficient on VSI could indicate that exporters of partner countries are not lobbying against protectionism on local governments.

Among the most important macroeconomic determinants, the study includes MFN (or effectively applied tariff) rates and RBER. While the coefficient associated to tariff rate indicates the extent to which AD and tariff rates act as a complementary or substitute measure to trade policy, the sign of RBER coefficient can be ambiguous. Feinberg (1989) suggests that the coefficient should be positive as the depreciation of the local currency increase the probability of finding dumping, while Knetter and Prusa (2003) propose that the coefficient should be negative because a depreciation of the local currency does not provoke damage to the economy.

As in the tariff equation, we use year fixed effects to control for domestic macroeconomic determinants of policy trade responses that vary across years as well as for microeconomic determinants of trade policy. In both equations, we explain the presence and level of trade

barriers in a 6-digit HS product imported from a particular country in a given year. This disaggregation is required because tariff and non-tariff barriers are determined at the product level.

4. ESTIMATION AND RESULTS

The estimates from a baseline partner and year fixed effects model of applied bilateral tariffs are summarized in Table 4.1. In the model, the year fixed effect controls for any domestic macroeconomic change such as the level of economic activity or unemployment in the reported countries. The partner fixed effect controls for any particular determinant of protection towards that partner that is time-invariant, as for example distance, institutional similitudes, as well as similarities in the comparative advantage. The model performs well.

TABLE 4.1 - *Baseline Model of Applied Bilateral Tariffs for Argentina, Brazil and Mexico*

	ARG	BRA	MEX
<i>t</i> BNDRPF	0.2502 *** <i>0.0013</i>	0.2867 *** <i>0.0011</i>	0.3006 *** <i>0.0008</i>
IIT	1.6420 *** <i>0.0519</i>	1.2547 *** <i>0.0353</i>	-0.3437 *** <i>0.0483</i>
VS	10.7300 *** <i>0.1151</i>	17.6481 *** <i>0.1689</i>	-13.7267 *** <i>0.0753</i>
VS1	-10.4062 *** <i>0.1182</i>	-23.5130 *** <i>0.1001</i>	-42.9247 *** <i>0.1363</i>
N	405806	520806	631402
Partner FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R ²	0.3577	0.4189	0.5614

Notes: (1) Dependent variable is applied tariff; (2) *t*_{BNDRPF} is the bound rate augmented by preferential rate when applicable; (3) Standard errors in italics; (4) *** p<0.01; (5) Data pooled across 2002-2010.

The coefficient of 0.25 on *tbnprf* for Argentina indicates that if bound rate (adjusted for PTA agreements) increases one point Argentina's bilateral applied tariff increases 0.25 points. In general, the presence of small coefficients associated to this variable is the rule in the table and they may indicate that WTO incentives kept applied tariffs in check. A similar explanation is found in Gawande *et al.* (2011).

The coefficient of 1.64 on IIT for Argentina indicates that a higher IIT is associated with an increase in Argentinean tariffs. This is quite the opposite of the prediction from intra-trade models that emphasize the additional welfare gains from expanding the varieties⁹. Besides, the positive sign on IIT could indicate the dependence of Argentina on tariffs as a source of public revenues. Since much of the Argentinean trade is with PTA's associates, more revenues mean higher tariffs on non-PTA partners, even if trade with them is two-way trade in similar goods. For Mexico, however, IIT has a negative coefficient that may indicate the additional welfare from expanding the variety in differentiated products. In this case, the gains from trade appear to overwhelm the revenues reasons for raising tariffs.

While measures of VS do not dissuade the use of tariff in Argentina and Brazil, it does deter their use in Mexico. Recall that the VS measure of vertical specialization is the share of imports in a sector that is used directly and indirectly in the country's own exports (i.e. embedded as intermediate inputs). So, while the exporters of countries included in the first club of nations are not powerful enough to overcome the need to raise revenues, the importance of exporters in Mexico is apparently significant.

The second vertical specialization measure (VS1) shows a negative coefficient across the table. This could be interpreted as a global supply chain against protectionism. The coefficients suggest that the governments are enthusiastic to enhance their exporters' interests by reducing tariffs on the inputs used by (upstream) home exporters in order to enhance their competitive position with foreign users. The negative coefficients may also be taken as evidence for the idea that exporters in foreign countries may (politically) influence home tariffs since their competitiveness depends on the supply of cheap inputs from home producers.

Following Gawande *et al.*, (2011), each variable is interacted with a post-crisis dummy to find out whether the relationships observed in Table 4.1 remained unaltered through the crisis or were fundamentally changed by it. The results are presented in Table 4.2.

The positive and statistically significant coefficient on the interaction term *tbnprfxI2009* in Argentina and Brazil indicates that these countries did not lower their tariffs, but they feel the pressure to raise them in the post-crisis period. In the case of Argentina, for example, the

⁹ The results presented in Jørgensen and Schröder (2006) and Brander and Spencer (1984) could also explain the positive correlation we have found.

coefficient on *tbindprf* increased by 0.026 in 2009 over a pre-crisis coefficient of 0.24, signaling a readiness to increase tariffs up to the bound levels.

TABLE 4.2 - *Explaining Applied Bilateral Tariff Before and after 2009*
in Argentina, Brazil and Mexico

	ARG	BRA	MEX
<i>t</i> BNDRPF	0.2436 ***	0.2707 ***	0.3307 ***
	<i>0.0014</i>	<i>0.0011</i>	<i>-12.4735</i>
IIT	1.8771 ***	1.3880 ***	-0.4970 ***
	<i>0.0573</i>	<i>0.0392</i>	<i>0.0556</i>
VS	11.0759 ***	12.5779 ***	-11.9952 ***
	<i>0.1273</i>	<i>0.1890</i>	<i>0.0868</i>
VS1	-10.9265 ***	-20.0695 ***	-39.6396 ***
	<i>0.1309</i>	<i>0.1121</i>	<i>0.1570</i>
<i>t</i> BNDRPFxI2009	0.0255 ***	0.0655 ***	-0.1147 ***
	<i>0.0021</i>	<i>0.0018</i>	<i>0.0014</i>
IITxI2009	-1.2729 ***	-0.4936 ***	0.5272 ***
	<i>0.1294</i>	<i>0.0840</i>	<i>0.1032</i>
VSxI2009	-1.7366 ***	23.2473 ***	-6.6868 ***
	<i>0.2933</i>	<i>0.4024</i>	<i>0.1680</i>
VS1xI2009	2.4124 ***	-15.8650 ***	-12.4735 ***
	<i>0.2865</i>	<i>0.2316</i>	<i>0.2992</i>
N	405806	520806	631402
Partner FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.3586	0.4270	0.5677

Notes: (1) Dependent variable is applied tariff; (2) *t*_{BNDRPF} is the bound rate augmented by preferential rate when applicable; (3) Standard errors in italics; (4) *** p<0.01; (5) Data pooled across 2002-2010.

The coefficient on *IITxI2009* for Argentina is negative. However, if one considers the overall impact of IIT post-crisis on the level of the tariff (1.8771-1.2729), one may conclude that Argentinean public finances effectively depend on tariff revenues. The same conclusion may be applied for Brazil. We also observe that the overall impact of IIT on Mexico has changed after the crisis. In fact, while before the crisis the theory emphasizing the additional welfare gains from expanding the varieties was verified, after the crisis the theory of tariff revenue dependency was applied.

As to the vertical specialization measures, the coefficient of *VS1xI2009* shows a large negative one for Mexico and Brazil. In the post-crisis period, the export sectors in Brazil's partner countries seem to have a strong influence on lowering their tariffs, particularly on products that

the partners import from those countries for intermediate use¹⁰. To a lesser extent, this source of anti-protectionism is also evident in Argentina.

Table 4.3 presents the result of the estimation including good fixed effects. The coefficients associated with the institutional variable *tbndprf* do not present a significant change in comparison with the previous specification. However, one may see some changes on the overall impact of IIT on protectionism after the crisis. In fact, while a positive impact of IIT in the level of the tariff was previously the rule (indicating that a weak tax system in these countries relies almost at all on tariff revenue), when considering product fixed effect this relation has changed. On this new approach, there is evidence that in Argentina the gains from trade in similar, but differentiated products appear to overwhelm the need to use tariff for revenues purposes.

TABLE 4.3 - *Applied Bilateral Tariff with Product Fixed Effect in Argentina, Brazil and Mexico*

	ARG	BRA	MEX
<i>tbndprf</i>	0.3738 *** <i>0.0008</i>	0.3587 *** <i>0.0009</i>	0.3939 *** <i>0.0006</i>
<i>tbndprfxi2009</i>	0.0399 *** <i>0.0009</i>	0.0758 *** <i>0.0008</i>	-0.1093 *** <i>0.0009</i>
IIT	-0.0366 *** <i>0.0275</i>	0.0068 *** <i>0.0196</i>	-0.3247 *** <i>0.0365</i>
<i>IITxi2009</i>	-0.4264 *** <i>0.0548</i>	-0.0038 *** <i>0.0381</i>	0.6951 *** <i>0.0651</i>
N	403587	520806	631358
Partner FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Product	Yes	Yes	Yes
R-squared	0.3115	0.3337	0.4693

Notes: (1) Dependent variable is applied tariff; (2) *t_{BDNPRF}* is the bound rate augmented by preferential rate when applicable; (3) Standard errors in italics; (4) *** p<0.01; (5) Data pooled across 2002-2010.

The study looks at the incidence of AD initiations using conditional logit models with partner, product and year fixed effects. Previous studies of trade defense measures have restricted their samples only to sectors in which these kinds of measures have taken place. In our study, we compare 6-digit HS commodities on which AD investigations occurred with the overwhelming number of cases in which these investigations do not exist.

¹⁰ A lower cost makes partners more competitive and, in turn, this situation increase the purchases from Brazilian suppliers and expand their exports.

Table 4.4 presents the results of estimating the *AD equation*. All the countries in the sample show a positive relationship between AD initiations and the tariff level. This could suggest that both measures are complementary. This relationship is only reinforced after the crisis in Argentina and it indicates that this country may have stepped-up AD investigations after the crisis as a complement to tariff barriers.

TABLE 4.4 - *Conditional Logit Model of the Incidence of AD Initiations before and after 2009 for Argentina Brazil and Mexico*

	ARG	BRA	MEX
t	0.0444 *** <i>0.0186</i>	0.1059 *** <i>0.0178</i>	0.0229 *** <i>0.0042</i>
VS	3.5078 *** <i>1.1251</i>	6.6032 *** <i>2.8009</i>	3.7400 *** <i>1.0817</i>
VS1	-0.1454 <i>1.2038</i>	3.5772 *** <i>1.6331</i>	4.3331 *** <i>1.5355</i>
RBER	-1.5047 *** <i>0.5875</i>	-2.2312 *** <i>0.8672</i>	0.0231 <i>0.0658</i>
Imports	0.0000 <i>0.0000</i>	0.0000 *** <i>0.0000</i>	0.0000 <i>0.0000</i>
Unit Values	-0.0134 <i>0.0240</i>	-14.0099 *** <i>7.2951</i>	-64.5921 *** <i>21.4922</i>
txl2009	0.0523 *** <i>0.0238</i>	-0.0089 <i>79.4899</i>	-0.0033 <i>0.0462</i>
VSxl2009	-5.4049 *** <i>1.8031</i>	0.8666 <i>17274.2700</i>	-5.8989 <i>4.7066</i>
VS1xl2009	0.2014 <i>1.9595</i>	-1.5298 <i>10344.7600</i>	-4.7378 <i>6.5183</i>
Importsxl2009	0.0000 <i>0.0000</i>	0.0000 <i>0.0070</i>	0.0000 <i>0.0000</i>
UnitValuesxl2009	-0.0146 <i>0.0559</i>	-13.9624 <i>49282.1500</i>	-45.8221 <i>102.7704</i>
RBERxl2009	1.2404 *** <i>0.4894</i>	-0.1363 <i>3340.1530</i>	-0.5507 <i>0.5213</i>
N	148284	125851	159138
Partner FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: (1) Dependent variable is a binary variable indicating the presence of an AD initiations in a particular HS 6 digit sector; (2) Standard errors in italics; (3) *** p<0.01.

The coefficient on RBER is negative and statistically significant for Argentina and Brazil. This indicates that an appreciation of their currency against the currency of their trading partners makes an AD initiation more likely to occur. When this variable is evaluated in the post crisis period, the study finds that the coefficient has reduced in Argentina and remains the same in

Brazil. Consequently, the crisis has not reinforced the relationship between movements in the exchange rate on the probability of an initiation of an AD procedure.

The coefficients on VS are positive for all countries. For the post-crisis years, Argentina is the only country where a change in the relationship between VS and AD is detected. Specifically, this may indicate that Argentinean exporters are now more powerful in fighting against AD initiations over their imports.

As to VSI, the coefficient is positive for Brazil and Mexico. Recall that a negative sign on this variable may indicate that government favors global supply chains while a positive one could indicate that foreign exporters do not have political influence on the local economic policy.

While in Table 4.4 one may observe that the propensity to initiate an AD is positively related with the level of the tariff effectively applied on a particular product, it is important to consider that some problems of endogeneity may emerge. The strategy in our study is to control for 6-digit HS product-fixed effect. Our empirical approach assumes that the endogeneity problem could arise due to a non-observed variable that determines both AD initiations and the level of the tariff. Such non-observed variable could be the political strength of domestic producers of each 6-digit HS product. Therefore, controlling for product, year and partner fixed effects is our last estimation and we present the results of this specification in Table 4.5.

For Argentina, the most important determinant of the probability of an AD initiation is the *RBER*. It means that the propensity to initiate a trade defense measure in Argentina strongly depends on the level of appreciation of its currency against its partner's countries and that for years after 2008 this relationship has been reinforced. After the crisis one can observe a complementarity between both measures of protectionism.

TABLE 4.5 - *Conditional Logit Model of the Incidence of Antidumping Initiations with Product Fixed Effects for Argentina, Brazil and Mexico*

	ARG	BRA	MEX
t	-0.0008	0.1708 ***	0.1604 ***
	<i>0.0303</i>	<i>0.0456</i>	<i>0.0392</i>
RBER	-1.5824 ***	-2.6676 ***	0.0207
	<i>0.5957</i>	<i>0.9227</i>	<i>0.0783</i>
Imports	0.0000	0.0001 ***	0.0000
	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>
Unit Values	-0.0052	-1.8700	-42.1161 ***
	<i>0.0067</i>	<i>4.4753</i>	<i>25.4968</i>
txl2009	0.0563 ***	-0.0409	-0.0397
	<i>0.0274</i>	<i>63.9757</i>	<i>0.0508</i>
Importsxl2009	0.0000	0.0000	0.0000
	<i>0.0000</i>	<i>0.0127</i>	<i>0.0000</i>
Unit Valuesxl2009	-0.0025	1.7309	-27.9655
	<i>0.0349</i>	<i>11457.6900</i>	<i>85.7151</i>
RBERxl2009	1.3088 ***	0.2594	-0.5714
	<i>0.5224</i>	<i>2865.8620</i>	<i>0.5071</i>
N	11831	5644	6911
Partner FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Product FE	Yes	Yes	Yes

Notes: (1) Dependent variable is a binary variable indicating the presence of an AD initiations in a particular HS 6 digit sector; (2) Standard errors in italics; (3) *** p<0.01.

With regard to Brazil, Table 4.5 shows that the propensity to initiate an AD depends on the level of the tariff and the *RBER*. It indicates that tariff and non-tariff barriers are complementary and that the propensity to initiate an AD in Brazil depends on the level of appreciation of its currency against its partner's countries. Besides, the impact of these variables on the probability of initiating an AD remains the same after the crisis.

In Mexico, AD initiations and tariff appear to be complementary and the lower prices for product imported from partners are more likely to lead to an AD initiation. Both effects are not reinforced after the crisis.

5. CONCLUDING REMARKS

This paper explores the macro and microeconomic determinants of tariff and AD barriers in Argentina, Brazil and Mexico using pre- and post-2008 GR trade and protection data. The study finds that institutional incentives appear to have kept applied tariff in control. In fact, in spite of

that all countries have plenty of space to raise tariff, they did not strongly use it.

It also finds that IIT is associated with an increase in tariffs with the exception of Mexico. This could indicate that the countries strongly depend on tariff as a source of government revenue. After the crisis, the overall impact of IIT on tariff level is positive thus reinforces the dependence on tariff revenues.

The positive coefficients for Argentinean and Brazilian VS measures indicate that exporters of these countries are not powerful enough to avoid the increase in federal government revenues. The estimations show that the crisis did not change the relationship between the level of VS and the tariff. Thus, we observe some heterogeneity across the countries since Mexican exporters were successfully in demanding protectionism.

The negative coefficient associated with the VS1 (i.e. the proportion of a sector's exports used as intermediates by exporters in other countries) suggests that governments are enthusiastic to favor their exporters by reducing tariffs on the inputs used by (upstream) home exporters in order to enhance their competitive position with foreign users. The negative coefficient could also support the idea that foreign exporters have influence in determining trade liberalization in the LAC analyzed.

As to AD determinants, tariff and non-tariff protectionist measures are complementary. The evidence for Argentina points out that this country may have further increased AD investigations after the crisis as a complement to tariff measures.

Finally, the coefficient on RBER is negative and significant for Argentina and Brazil. This indicates that an appreciation of their currency against the currency of their trading partners makes an AD initiation more likely to occur. When this variable is evaluated in the post-crisis period, the study finds that the coefficient has been reduced in Argentina and it remains the same in Brazil. Consequently, the crisis has not reinforced the relationship between movements of the exchange rate on the probability of an initiation of an AD procedure.

As it can be seen, some of our estimation results show that Mexico stands out as an outlier with respect to Argentina and Brazil. While it is not the purpose of this study to further analyze this circumstance, we believe this is probably due to the fact that Mexico was a member of the North

American Free Trade Agreement and now of United State-Mexico-Canada Agreement, and it is strongly integrated in the U.S. international value chain. Further research agenda will surely shed some light on this topic.

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