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Abstract

One consequence of the proliferation of preferential trade agreements is that an increasing share of international trade is not subject to most favored nation tariffs, but rather enters markets through preferential access. The objective of this paper is to better investigate to what extent preferential market access affects bilateral trade. In doing so, the paper first provides two indices of market access conditions that take into account the complex structure of tariff preferences. One index summarizes direct market access conditions (the overall tariff faced by exports), while the other measures relative market access conditions (the overall tariff faced by exports relative to that faced by foreign competitors). Then, the paper explores the effects of preferential access on international trade by estimating a gravity model augmented by the two indices. The results indicate that both direct and relative market access conditions affect bilateral trade. Although a large majority of countries benefits from the system of preference because of improved direct market access, some countries see part of their benefits eroded, sometimes substantially, by the deterioration in their relative market access conditions.

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JEL classification: F10, F15

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1. Introduction

Over the past thirty years, trade liberalization has been used as an effective development tool, based on the evidence that there are many benefits that a country can gain from more active participation in world trade. While tariff liberalization was initially pursued through trade agreements under the auspices of the World Trade Organization (WTO), preferential trade agreements (PTAs)[1] are the basis of the more recent trade liberalization process. The proliferation of PTAs in the recent past has been impressive. In 1994, at the launch of the WTO, only 37 such agreements were in place. By 2010 more than 230 of them had been implemented, with more in the implementation stage. Participation in regional and bilateral trade agreements is widespread, as virtually all members of the WTO participate in one or more PTAs.

There are two key reasons for the proliferation of preferential trade. The first relates to the sluggish pace of multilateral trade liberalization since the conclusion of the Uruguay round (Bagwati, 2008). The second has to do with the domino effect (Baldwin and Jaimovich, 2010): once a preferential agreement is formed, trade becomes relatively more costly for non-member countries, and this provides incentives to join an existing agreement or to form new ones. A consequence of the increasing number of PTAs is that a rising share of international trade enters markets through preferential access.[2] This has implications for international trade because preferential access promotes trade by reducing tariffs among member countries. Therefore, preferential access is essentially a discriminatory practice that may divert trade from non-members to member countries.

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[1] By PTA we refer to all types of preferential trade agreements.

[2] Although about 40 percent of world trade is free under most-favored nation (MFN) regimes, an additional 30 percent is exempted from tariffs because of preferential access.

Since the seminal work of Viner (1950), the economic profession has extensively studied the effects of PTAs on international trade. Initially, the literature focused on the effects of PTAs both for member and non-member countries from a theoretical standpoint (e.g. Kemp and Wan, 1976; Grossman and Helpman, 1995; Krishna, 1998; Ornelas, 2005). More recently, an increasing number of empirical studies has investigated the actual effects of PTAs on trade.[3] While this literature generally agrees in finding large and positive effects of PTAs on trade flows among members[4] (e.g. Baier and Bergstrand, 2007 and 2009; Magee, 2008) there is not conclusive evidence in regard to the effects on non-member countries. For example, Clausing (2001) and Calvo-Pardo, Freund and Ornelas (2009) find trade creation but no trade diversion effects with regard to the US-Canada FTA and the ASEAN regional trade agreement. Similarly, Freund (2010) does not find evidence of trade diversion effects in the analysis of six trade agreements in Latin America and Europe. On the other hand, a number of studies find both trade creation and trade diversion effects. For example, Trefler (2004) finds trade diversion effects resulting from the US-Canada FTA and Romalis (2007) finds trade diverting effects in regard to the North American FTA. Similarly, Carrère (2006) finds trade diversion when examining the effects of seven regional trade agreements and Lee and Shin (2006) find trade diversion depending upon certain characteristics of member countries in the analysis of East Asian free trade agreements.

Most of the literature has generally examined the overall impact of PTAs as a discrete event rather than focusing on tariff liberalization.[5] Although quite informative, this approach captures not only tariff changes but also any other advantage that PTAs

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[3] Freund and Ornelas (2010) provide a thorough review of the literature related to PTAs.
[4] One dissenting study is Ghosh and Yamarik (2004). In their analysis of 12 regional trade agreements, they are skeptical about the results of the previous literature showing positive trade creation effects. The use of fixed-effect estimation in the subsequent literature has somewhat alleviated their criticism.
[5] One exception is a study by Robertson and Estevadeordal (2009). Their findings suggest that the tariff liberalization of Latin American countries between 1985 and 1997 caused trade-diverting effects.

usually imply, such as customs harmonization, trade facilitation mechanisms, and overall reductions in non-tariff measures and other trade costs. This paper adds to the existing literature by isolating the effect of tariff preferences so as to better capture the heterogeneity of trade effects for member and non-member countries. More precisely, this paper provides two contributions. The first contribution consists of two indices measuring market access conditions taking into account the complex structure of tariff preferences. One index summarizes the tariffs faced by exports and is related to the work on trade restrictiveness (Anderson and Neary, 2005; Kee, Nicita and Olarreaga, 2008 and 2009). The other index measures the relative tariff advantage or disadvantage that the tariffs provide vis-à-vis foreign competitors. This index builds on the work on preferential margins (Low, Piermartini and Richtering, 2009; Carrère, de Melo and Tumurchudur, 2010; and Hoekman and Nicita, 2011). The second contribution of this paper consists of an analysis of whether bilateral trade depends not only on direct market access conditions, but also on the market access conditions applied to third countries. The analysis is based on a gravity model augmented by the two indices.

The findings of this paper indicate that direct market access conditions have generally improved during the period of analysis (2000-2009) and that relative market access conditions have evolved from a situation where few bilateral trade relationships enjoyed large preferential margins to a situation where the system of preference is beneficial to a larger number of bilateral trade relationships but is less discriminatory (i.e. resulting in a lower relative preferential margin). In terms of magnitude, the results indicate that direct market access conditions are of primary importance in stimulating trade. However, relative market access conditions also have a significant impact. The greater the relative advantage provided by the system of preferences the larger bilateral trade flows are found to be. The results also find that although a large majority of countries benefits from the overall system of preferences, some countries see part of

their benefits eroded, sometimes substantially, by the deterioration in their relative market access conditions.

The remainder of this paper is organized as follows. The next section illustrates the empirical approach for assessing the impact of preferential access on trade flows. Section 3 briefly summarizes the data. Section 4 provides some statistics on market access measures and discusses their impact on trade flows. Section 5 concludes.

2. Market access and trade flows

In the last decade, market access conditions have increasingly been affected by bilateral trade agreements. Trade agreements generally provide trading partners with lower tariffs. As a result, countries apply different tariff rates to the same product depending on its origin. As of 2009, in about 40 percent of international trade there is no discrimination, as each given country applies the same tariff to all trading partners (at the HS 6-digit level). About 30 percent of trade is in products where two different tariff rates are applied. The remaining 30 percent of trade consists of products where countries apply three or more different tariff rates.

The fact that countries apply different tariff rates to identical products depending on their origin has importance for exporters. From an exporter's perspective, market access depends not only on the disadvantages that exporters face versus domestic producers, but also on the relative advantages or disadvantages that exporters have versus competitors from other countries. In tariff terms, the disadvantage versus domestic competitors is simply given by the tariff applied to the specific good, while the advantage or disadvantage versus foreign competitors is given by the preferential margin. In practice, the preferential margin provides a measure of the strength of

preferential access. The higher the preferential margin, the larger is the advantage of a given country's exporters versus foreign competitors.

Preferential access is primarily granted with the intent to increase trade. For example, high income countries often grant non-reciprocal preferential access to least developed countries in order to facilitate the latter's economic growth by providing an incentive to their exports. Likewise, regional trade agreements are a common form of reciprocal preferential access in which lower (or zero) tariffs are applied to products originating among members, so as to foster bilateral or regional cooperation. Agreements as such, by providing some trading partners with a lower tariff, inevitably discriminate against those trading partners outside the trade agreement (Hoekman, Martin and Primo Braga, 2009).

Preferential access produces diverse effects across members depending on differences in the existing tariff regimes, implementation periods and tailored exceptions. For example, some trade agreements may give great advantages because of high external tariffs; while others may have more muted effects because preferential treatment is granted to a large number of countries. Similarly, the effect of preferential access also varies across non-member countries. The differences largely depend on whether key export sectors are affected by preferences conceded to foreign competitors.[6]

The following two sections illustrate the empirical approach to measure the effect of market access on trade flows. The first section presents the two indices measuring market access conditions. One index summarizes the tariffs faced by exports; the other index measures the preferential margin at the bilateral level. The second section lays

[6] This issue also relates to preference erosion: countries who enjoy preferential access because of pre-existing agreements see their preferential margin eroded when key trading partners enter new PTAs.

down the estimating framework utilized in assessing the contribution of the two indices to explain bilateral trade flows.

2.1 Market Access

To measure market access conditions we provide two trade policy variables: the first measure captures *direct* market access conditions (the overall tariff faced by exports), the second measure captures *relative* market access conditions (the overall tariff faced by exports relative to that faced by foreign competitors). Both measures are calculated at the bilateral level.

The first measure derives from Anderson and Neary's (1994 and 2003) mercantilist trade restrictiveness index (MTRI) and is directly related to the partial equilibrium simplification developed by Feenstra (1995) and implemented as the overall tariff restrictiveness index (OTRI) in the work of Kee, Nicita and Olarreaga (2008 and 2009).[7] This index provides the uniform tariff rate that yields the same level of imports as the differentiated structure of restrictions. In this paper, the measure capturing *direct* market access conditions, although methodologically identical to the OTRI, is labeled tariff trade restrictiveness index (TTRI) to account for its more limited trade policy coverage (i.e. only tariffs). In the construction of these indices, the aggregation across products takes into account the fact that the imports of some goods may be more responsive than others to a change in tariffs. Intuitively, products where imports are less sensitive to prices (inelastic) should be given less weight because preferential access

[7] The authors show (following Feenstra, 1995) that the calculation of the MTRI can be greatly simplified in a partial equilibrium setting so as to take into account only own price effects, while ignoring cross price effects on import demand. In doing so, the OTRI can be calculated as a weighted average of the levels of protection (tariff and non-tariff measures) across products where the weights are functions of import shares and import demand elasticities.

(a lower tariff) would have a lesser effect on the overall volumes of trade. In formal terms, the TTRI faced by country *j* in exporting to country *k* is:

$$TTRI_{jk} = \frac{\sum_{hs} x_{jk,hs} \varepsilon_{jk,hs} T_{jk,hs}}{\sum_{hs} x_{jk,hs} \varepsilon_{jk,hs}} \qquad (1)$$

where *x* indicates exports from country *j* to country *k* at the product level, ε is the bilateral import demand elasticity, *T* is the applied tariff, and *hs* are HS 6-digit categories. This index provides the equivalent uniform tariff that will maintain the exports from country *j* to country *k* constant. [8]

The variable measuring the effect of the system of preferences *relative* to foreign competitors is provided by the second index, which we label relative preferential margin (RPM). The RPM builds on the arguments of Low, Piermartini and Richtering (2009); Carrère, de Melo and Tumurchudur (2010); and Hoekman and Nicita (2011). These studies recognize that the commonly used measure of preference margins (the difference between the preferential tariff and the MFN rate) generally overestimates the actual benefits of preferences. Given the increase in the number of PTAs, a better measure of the preferential margin is one where the counterfactual is not the MFN tariff, but the preferential access provided to other foreign competitors. In practice, a proper measure of preferential margin should allow for the fact that preferential rates

[8] To illustrate this, consider that the fall in the value of export of country *j* to country *k* of a specific product *hs* due to the bilateral tariff T_{jk} is given by: $x_{jk} \varepsilon_{jk} T_{jk}$. Summing over products to compute the overall trade loss due to tariffs leads to: $\sum_{hs} x_{jk,hs} \varepsilon_{jk,hs} T_{jk,hs}$. Similarly, the trade loss from a uniform tariff across products is $\sum_{hs} x_{jk,hs} \varepsilon_{jk,hs} TTRI_{jk}$. Finally, setting these two expressions equal and solving for the *TTRI* results in equation (1).

granted to a particular country, although lower than MFN, could still penalize it relative to other countries that benefit from even lower or zero tariffs. To allow for this, the RPM is calculated as the difference, in tariff percentage points, that a determined basket of goods faces when imported from a given country relative to being imported from any other.[9]

There are two sets of weights when calculating the RPM. First, the counterfactual (the tariff faced by foreign competitors) is a weighted average of the tariffs imposed on all other trading partners. Second, the overall tariff imposed on each exporter is a weighted average comprising the tariffs of many products. To calculate the counterfactual, the first step is to calculate the trade weighted average tariff at the tariff line level that one country (e. g. the USA) imposes on all other countries except the country for which the preferential margin is calculated (e. g. Mexico). This is done by using (USA) bilateral imports as weights, so as to take into account the supply capacity of (USA) trading partners. The second step is to aggregate across products. This is done by using (Mexico) exports (to the USA) so as to take into consideration the different product compositions across partners. As in the TTRI case, a further complication relates to demand responses to changes in the tariffs.[10] This issue can be correct by using import demand elasticites in aggregating across products.

In more formal terms, the RPM measuring the advantage that country *j* has in exporting its goods to country *k* can be calculated as:

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[9] To clarify with an example, in the RPM of Mexico vis-à-vis the USA, the counterfactual is the average tariff for Mexico's export bundle to the USA if this bundle were to originate from other countries. The relative preferential margin is the difference between the counterfactual and the bilateral trade-weighted preferential tariff imposed by the USA on Mexico.

[10] When aggregating across product lines, the overall relative preferential margin should be higher if the exporting country has a higher preferential margin in products for which demand is more elastic to small changes in prices.

$$RPM_{jk} = \frac{\sum_{hs} x_{jk,hs}\varepsilon_{jk,hs}(T_{wk,hs} - T_{jk,hs})}{\sum_{hs} x_{jk,hs}\varepsilon_{jk,hs}}, j \neq k \text{ , with } T_{wk,hs} = \frac{\sum_{v} x_{vk,hs}T_{vk,hs}}{\sum_{v} x_{vk,hs}}, v \neq j \quad (2)$$

where notation is as above and v denotes countries competing with country j in exporting to country k, so that the term $T_{wk,hs}$, is the trade weighted average of the tariffs applied by country k to imports originating from each country v (for each HS 6-digit product).

Note that any measure of preference margin could be positive or negative, depending on the advantage or disadvantage of the country with respect to other competing exporters. The RPM varies between the negative of the TTRI (maximum negative bias, i.e. being the only trading partner facing tariffs when all other exporters enjoy duty free access) and the MFN tariff rate (maximum positive bias, i.e. being the only trading partner enjoying duty free access while all other exporters face MFN tariffs). RPM is exactly zero when there is no discrimination (i.e. the importing country applies identical tariffs across all existing trading partners).[11] In summary, the RPM provides a measure of the tariff advantage (or disadvantage) provided to the actual exports from country j to country k, given the structure of the tariff preferences of country k. As the RPM provides the relative advantage not with respect to the average, but to each trading partner, it also captures the discriminatory effects of the overall system of preferences.

[11] Note that at the product level and in a three-country setting (one importer and two exporters) the sum of the bilateral RPMs across countries is zero (i.e. the advantage of one exporter is equal to the disadvantage of the other exporter). As the RPM is relative to all other exporters, this property is lost when allowing for more than two exporters. Still, this is a valuable property as the RPM could be used to provide some insight on the extent of trade diversion at the product level, not bilaterally, but between a given country and all other countries lumped together.

Although the TTRI and RPM represent an improvement over other aggregate indicators of trade policy, these two indices are still imperfect measures of direct and relative market access. As all other trade weighted measures, both the TTRI and RPM depend not only on trade policy but also on trade values. In terms of dynamics, weighted indicators improve when trade shifts towards products that are less restrictive. For example, the TTRI declines when the export mix of a country shifts towards products that face a lower tariff. Similarly, RPM increases when the export mix shifts toward products where the preferential margin is higher. Although the use of import demand elasticities softens the endogeneity problem of trade to tariff, a related problem is that both indices consider only the positive value of imports, and thus they do not take into account prohibitive tariffs. These problems result in a systematic underestimation of the effect of tariffs which could be corrected by setting the weights in the indices at trade levels that would arise in a tariff-free world. As this is not possible because these levels are not observable, the issue can nevertheless be softened by keeping trade weights fixed over time in order to correct for some of the endogeneity. This is the approach we follow in the econometric estimation.

Limitations are also related to the comprehensiveness of the indices, which is a trade-off for their computational simplicity. In particular, these indices only take into account the direct own price effects of tariffs and ignore the general equilibrium of cross price effects. Thus, the indices are primarily suited to estimate the first order impacts of market access conditions on trade. Finally, these indices are calculated only with respect to tariffs and do not take into account any restrictive effects of non-tariff barriers (e.g. quotas, administered pricing, contingent protection measures, standards, etc.).

An important point is related to the interpretation of these indices. While the TTRI has the simple economic interpretation discussed above, the RPM has a more empirical interpretation. The RPM is a measure of the advantage provided by the

preferential access relative to other foreign competitors. In practice, the scope for the RPM is primarily to build a more reliable measure for the bias in the structure of preferences in order to allow for differences in terms of market access both across PTAs and for different members within the same PTA. For example, PTAs with higher external tariffs would provide a greater advantage (and thus result in a larger RPM) than those with lower external tariffs. Similarly, some PTAs may provide relatively fewer advantages when members already grant preferential treatment to a large number of countries. Finally, the effects would be lower for members exporting mainly products where the external tariffs (or elasticities) are low than for members whose export baskets are concentrated in highly protected products. All these factors are reflected in the RPM.

2.2 Estimating the effect of preferences on trade flows

The standard approach to measure the impact of policy variables on trade flows is the gravity model. This model relates bilateral trade to economic sizes and to trade and transaction costs often proxied by variables such as distance, common language, shared border, etc.[12] In such a setup, the effect of trade agreements is often estimated by including dummy variables for the presence of policy factors affecting trade. Although the econometric estimation of this paper follows that of the recent literature on gravity models, the approach in identifying the effect of trade liberalization is different. The difference is in the fact that the analysis is not based on discrete events (i.e. the effects resulting from the implementation of a PTA). Rather, the analysis examines market access conditions in terms of tariff changes, whether they are caused by PTAs or not.

[12] Linder, 1961; Linnemann, 1966; Anderson and van Wincoop, 2003.

In summary, the estimating framework consists of a panel gravity model where a set of fixed effects controls for all the determinants of trade flows normally included in gravity model specifications, while the impact of PTAs is measured solely on the basis of its effect on preferential tariffs. To capture the effect of changes in preferential tariffs, the estimation includes the two trade policy variables discussed above: the TTRI which measures the direct effect of the preferential tariff on trade, and the RPM which measures the effect of the preferential tariff taking into account the overall tariff structure. By including the RPM in the estimation we examine whether the effect of the change in tariffs is stronger the greater the advantage it provides relative to other competitors. In practice, one should expect a negative sign for the TTRI coefficient, as a lower tariff would promote trade, and a positive sign for the RPM coefficient, as a relatively higher preferential margin would provide an additional advantage.

An issue related to the estimation of the gravity model is that the inclusion of gravity type variables alone does not take into account all the factors impeding bilateral trade flows. Well-specified gravity models consider not only frictions between pairs of countries, but also frictions relative to the rest of the world. In particular, one needs to control for multilateral resistance: the presence of the unobserved relative trade impediments that a country has with all its trading partners (Anderson and van Wincoop, 2003). In a panel setting, multilateral price terms are likely to be time varying and therefore it is necessary to estimate the model by using country-time fixed effects. Moreover, country-time fixed effects also capture any importer (and exporter) specific effects of the tariff regime.

Trade models dealing with policy variables often suffer from a problem of endogeneity. That is, countries choose to enter trade agreements (and thus reduce the tariffs) with partners where trade flows are larger. In cross-section models such

endogeneity is generally treated with the use of instrumental variables. However, instrumental variable estimation may not be fully satisfactory for treating policy variables because endogeneity bias may result from unobserved time-invariant heterogeneity (Baier and Bergstrand, 2004). In a panel setting, such endogeneity bias is treated by adding country-pair fixed effects (Baier and Bergstrand, 2007). Besides controlling for gravity type variables such as distance and shared border, country-pair fixed effects control for any unobserved variable simultaneously affecting the change in the tariff and the level of trade.

In summary, the estimation of the effect on trade from changes in market access conditions is based on a gravity model according to the following specification:

$$\ln X_{jkt} = \beta_0 + \beta_1 \ln(1 + TTRI_{jkt}) + \beta_2 RPM_{jkt} + \omega_{jt} + \psi_{kt} + \theta_{kj} + \phi_{jkt} \qquad (3)$$

where the subscript *j* denotes exporters, *k* denotes importers and *t* denotes year; and where X is the value of total exports from country *j* to country *k*, $TTRI$ is the tariff trade restrictiveness index as in equation (1), *RPM* is the real preferential margin as in equation (2); ω_{jt} is the importer-time fixed effects, ψ_{kt} is the exporter-time fixed effects, θ_{kj} is the importer-exporter pair fixed effects and ϕ_{jkt} is an i.i.d error term with mean zero and variance λ.[13]

An issue to consider in gravity models is the presence of zero trade flows. As the gravity model is generally estimated in a log-normal specification, it will discard observations where there is no trade. Recent procedures to take into account zero trade flows are the Poisson estimation (Santos Silva and Tenreyo, 2006), or a two-stage

[13] Note that country-pair dummies also soak up any variance due to the presence of time invariant preferential trade agreements.

estimation procedure (Helpman, Melitz and Rubinstein, 2008; Burger van Oort and Linders, 2009). Our estimation procedure does not control for the presence of zeros for two reasons. The first reason is that, our main variables of interest, the RPM and the TTRI, utilize trade values (at the HS 6-digit level) as weight. Thus, these variables cannot be properly computed when all bilateral trade is zero. Second, the incidence of zero trade observations remains relatively limited in our sample. The matrix of bilateral trade has about 26 percent of zero-trade observations. However, country-pair fixed effects control for inexistent bilateral trade across all periods (about 5 percent) related to cases of small and distant countries (Frankel, 1997; Rauch, 1999), and importer-year fixed effects control for lack of data for given country-year periods (about 4 percent). This leaves about 17 percent of observations where zero trade flows are not controlled for.

A final issue in estimating equation (3) resides with the standard errors of the coefficients of interests β_1 and β_2. These standard errors have to take into account the fact that the elasticities used in the construction of the indices are also estimates. Therefore, to compute the correct standard errors we apply the following bootstrap procedure. First, for each HS 6-digit product and country we randomly draw one $\varepsilon_{jk,hs}$ from its normal distribution. Second, we calculate both indices using the random draw of $\varepsilon_{jk,hs}$ and we pair these indices with a random sample from the dataset used to estimate equation (3). All draws are with repetition. Third, we estimate equation (3) on the constructed random sample. We perform this procedure 100 times. Finally, we calculate the bootstrapped standard errors of the coefficients for the TTRI and RPM as the standard deviations of their 100 respective coefficients. Note that this procedure also allows calculating the standard error of both indices by simply using the 100 standard deviations of the indices themselves.

2.3 The RPM and the theoretically based gravity model

The empirical framework discussed above can be reconciled with the theoretically based gravity model as follows. In the standard Dixit-Stiglitz-Krugman model, country *k*' s import from country j is given by:

$$X_{jk} = \tau_{jk}^{1-\sigma}\left(\frac{Y_j E_k}{\Omega_j P_k^{1-\sigma}}\right) \tag{4}$$

where τ reflects trade costs, Y denotes output, E is the destination nation's expenditure on tradable goods, σ is the elasticity of substitution (σ>1) among all varieties from all nations (varieties are usually assumed to be symmetric for simplicity), P is country *k*'s ideal CES price index (all goods are assumed to be traded) and, Ω measures the real market potential of country *j*' s exports.[14]

Trade costs can be redefined as $\tau_{jk} = t_{jk} f_{jk}$ where t_{jk} is the tariff component of trade costs and f_{jk} incorporates other trade costs such as freight costs, the latter being mostly a function of geographical features. This definition of trade costs makes the price index prevailing in the destination country an explicit function of tariffs applied to varieties coming from different exporting countries. The properties of the price index do not allow separating tariffs from other components of the various landed price. This means that it is not possible to derive the RPM index from the standard Dixit-Stiglitz-

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[14] P_k and Ω_j are given respectively by $P_k = \sum_{i=1}^{N}\left(n_i\left(p_{ik}\right)^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$ and $\Omega_j = \sum_{i=1}^{N}\left(\tau_{ji}^{1-\sigma}\frac{E_i}{P_i^{1-\sigma}}\right)$, where p_{ik} is the landed price in nation *k* of goods produced in country *i* and n_i is the number of varieties exported from country *i*. The landed price is made of the producer price in the country of origin augmented by trade costs that are destination specific and take the standard iceberg form.

Krugman approach and, or from any approach using a CES utility function as representative of consumers' preferences. However, the scope of this paper is not to offer an alternative theoretical modeling strategy. In order to reconcile our measure with standard theory we simply include the RPM in equation (4) and assess the consequences in terms of empirical strategy. By adding both to the numerator and the denominator the two components of the RPM index (the tariff applied to competitors and the tariff applied to country *j*) , equation (4) becomes:

$$X_{jk} = f_{jk}^{1-\sigma} t_{jk}^{2-\sigma} \frac{t_{wk}}{t_{jk}} \left(\frac{Y_j E_k}{\Omega_j P_k^{1-\sigma} t_{wk}} \right) \qquad (4')$$

where t_{wk} is the average tariff faced by all exporters to country *k* other than those from country *j*.[15] Then, using standard proxies and measures defined in the previous section, equation (4') can be rewritten as

$$X_{jk} = f_{jk}^{1-\sigma} (1 + TTRI_{jk})^{2-\sigma} \left(\frac{1 + T_{jk}^{w}}{1 + TTRI_{jk}} \right) \left(\Omega_j P_k^{1-\sigma} \right)^{-1} \left(\frac{GDP_j GDP_k}{1 + T_{jk}^{w}} \right) \qquad (4'')$$

$$\text{where } T_{jk}^{w} = \frac{\sum_{hs} x_{jk,hs} \varepsilon_{jk,hs} (T_{k,hs}^{w})}{\sum_{hs} x_{jk,hs} \varepsilon_{jk,hs}}, j \neq k$$

Note that the measure of average tariff T_{jk}^{w} does not reflect the tariff component of the Anderson and Van Wincoop resistance term unless exports to country *k* from any trade partner all share the same composition in terms of products exported. Hence T_{jk}^{w}

[15] This average tariff is specific to the country of origin as it is computed using the number of varieties exported by country *j* to country *k* and not all varieties imported by *j*. This makes it different from the tariff component of price index prevailing in *k*. In this context, only the number of varieties matters, not the variety itself as they are all charged the same producer price within the same country.

should not be absorbed by the importer and time fixed effects, and as a consequence should be treated explicitly.

In the standard estimation approach bilateral exports are weighted by the product of GDPs. In our context this would mean treating the $1+T_{jk}^{w}$ term independently. As this may bring some additional statistical issues due to the possible correlation of the latter term with $1+TTRI_{jk}$ this suggests another implementation strategy. Instead of imposing a unity coefficient on the product of GDPs as done with the standard weighting procedure, we keep the product on the right hand side and normalize it by $1+T_{jk}^{w}$.

The empirical specification corresponding to (4'') that we consider for estimation is thus given by:

$$\ln X_{jkt} = \beta_0 + \beta_1 \ln(1+TTRI_{jkt}) + \beta_2 \ln\left(\frac{1+T_{jkt}^{w}}{1+TTRI_{jkt}}\right) + \beta_3 \ln\left(\frac{GDP_j GDP_k}{1+T_{jkt}^{w}}\right) + \omega_{kt} + \psi_{jt} + \theta_{kj} + \phi_{jkt} \quad (5)$$

where the notation is as before. Specification (5) provides a theoretically based robustness for assessing the impact of trade preferences on exports. In practice, we do not expect considerably different results in estimating equation (5) versus equation (3).

3. Data

The data utilized in this paper is comprehensive of trade flows, tariffs and import demand elasticities. Trade data originates from the UN COMTRADE database; tariff data (MFN and preferential rates) originates from the UNCTAD TRAINS database. Trade and Tariff data is available through the World Integrated Trade Solutions

(wits.worldbank.org).[16] Import demand elasticities are from Kee, Neagu and Nicita (2011) and Kee, Nicita and Olarreaga (2008). GDP data is from the World Bank World Development Indicators database, while gravity type variables are from CEPII distance database.[17] Tariff, trade, and import demand elasticity data follows the Harmonized system at the 6-digit level. The underlining data to compute the bilateral TTRI and the relative preferential margin covers about 5000 different products for 94 countries, over 10 years (2000-2009).

The sample includes all major countries and covers more than 90 percent of world trade. Table 1 provides the list of the countries covered by the data. One contribution of this paper is also the provision of a dataset on the bilateral TTRI and RPM indices for each year of the analysis. This data is available from the authors on request.

4. Results

In this section we first illustrate some descriptive statistics of the two indices, we then discuss the results of the estimations from the gravity model, and finally we summarize the overall impact of preferential access on bilateral trade.

4.1 TTRI and RPM

The first step in the presentation of the results is to describe the two policy variables measuring bilateral market access conditions. Recall that the TTRI measures the tariff restrictiveness that exports of a given country face and the RPM provides the

[16] TRAINS preferential data is not always complete for the earlier years of the analysis. We further validate the data on tariff preferences by using some of the databases available online (McGill Faculty of Law Preferential Trade Agreements Database, the Tuck Trade Agreements Database, the WTO Regional Trade Agreements Database and Jeffrey Bergstrand Database on Economic Integration Agreements).
[17] http://www.cepii.fr/anglaisgraph/bdd/distances.htm

average tariff advantage (or disadvantage) that the country has in exporting relative to other foreign competitors. Recall also that since the primary scope of the two indices is to measure the restrictiveness of tariff regimes, the TTRI and the RPM are calculated with fixed weights by using the 1995-1997 trade averages.

The distributions of the TTRI in the first and last years of the analysis and of its change are plotted Figures 1a and 1b. The distributions of Figure 1a reflect the status of tariff restrictions on bilateral trade. Tariffs are generally low and have become even lower during the period of analysis. The average TTRI across all bilateral trade relationships was almost 8 percent in 2000 and decreased to about 4.5 percent in 2009. The comparison of the weighted and un-weighted distributions of Figure 1b indicates that large changes in TTRI have taken place in smaller trade flows. This is likely a result of the fact that a number of large trade flows were already liberalized in 2000 (e.g. intra EU, NAFTA and MERCOSUR trade) while the recent liberalization has affected relatively smaller trade flows. Figures 2a and 2b report the same distributions but for the RPM. Relative preferences are small and their distribution is highly concentrated around zero. For more than 90 percent of trade flows, RPM varies from minus 2 to plus 2 percent, and for more than half of trade flow the RPM is between plus and minus 0.5 percent. The simple average of the RPM across all bilateral trade flows was almost minus one percent in 2000 and increased to about minus one half of a percent in 2009. On average, an RPM closer to zero indicates that the system of preferences as a whole has become less discriminatory. In other words, the structure of preferences has moved from a situation where few bilateral trade relationships enjoyed relatively large preferential margins, to a situation where a higher number of bilateral trade relationships enjoyed positive, but relatively smaller, preferential margins. Figure 2b plots the weighted and un-weighted distributions of the changes in RPM. As in the case

of the TTRI, the change in the RPM between 2000 and 2009 has been larger for smaller trade flows.

Shifts in the TTRI and the RPM are often correlated as both indices depend on the tariffs faced by exports. The correlation of the changes of the two bilateral indices between 2000 and 2009 is illustrated in Figure 3. In the majority of cases, an improvement in direct market access reflects an improvement in relative market access conditions and vice-versa. Still, there are a number of cases (23 percent) where the reduction in the TTRI has not been accompanied by an amelioration of relative market access. This implies that the improvement in direct market access conditions was smaller than that provided to other foreign competitors. In these cases some of the advantage provided by the improvement in direct market access conditions is lost by the reduction in the relative preferential margin. On the other hand, in a very limited number of cases (3 percent) some of the amelioration of relative market access conditions is offset by an increase in trade restrictiveness. For these cases the deterioration in direct market access conditions has been smaller than that of foreign competitors.

Market access conditions vary substantially across countries. This variation is due to differences in the export baskets as well as in preferential access. To better analyze differences among countries, Table 1 provides the average market access conditions imposed on the export of each given country as a whole. These statistics are provided for the first and last years of the analysis for each country in our sample. In general, countries whose exports are largely concentrated on sectors where tariffs are low (e.g. primary products) and countries that are members of important free trade areas face a lower TTRI. On the other hand, countries whose major export products are subject to higher tariffs (e.g. agricultural goods) or countries that are not part of

preferential trade agreements tend to have a larger TTRI. In value terms, average export restrictiveness is not large and has significantly decreased between 2000 and 2009. The simple average TTRI across the countries in our sample has declined from about 3.7 percent to about 1.4 percent during the period of analysis while the number of countries facing very little restriction (a TTRI of less than 1 percent) increased from 10 to 52. For world trade as a whole, the TTRI has declined from about 3.2 percent to about 2 percent.

The RPM also varies substantially from one country to another. This variation largely depends on whether the country takes part in preferential agreements with regional partners and major trade partners. The RPM for 2009 varies from about minus 1.5 percent for Pakistan, Jamaica, India and Japan to more than 4 percent for El Salvador and Malawi. In general, countries that are part of large PTAs and low income countries benefiting from large preferential margins tend to have a higher RPM. On the other hand, high income countries and countries with limited participation in trade agreements are found to be those with a negative RPM. In regard to the change in RPM during the period of analysis, its simple average across countries has increased from about zero to about one half of a percent. This is due not only to the proliferation of PTAs but more so to the fact that PTAs are often being signed between countries with strong pre-existing trade and economic relationships (Wonnacott and Lutz, 1989; and Baier and Berstrand, 2004). In more detail, the results indicate that RPM has increased the most for countries which have recently either formed new PTAs (e.g. Central America), joined existing PTAs (e.g. EU enlargement), or entered PTAs with major markets (e.g. Turkey, Morocco, and Honduras). These countries have gained substantially in terms of relative preferential access. On the other hand, between 2000 and 2009 the RPM has decreased for countries that have been early adopters of PTAs (e.g. high income and Latin American countries) as well as for some least developed

countries. For these countries, the preferential margins of the past have been somewhat eroded by the proliferation of PTAs. Finally, RPM declined also for countries that did not actively engage in forming trade agreements with major trading partners (e.g China and India).

4.2. Econometric Results

This section discusses the results of the estimation of the gravity model discussed in Section 2. We estimate several specifications of the gravity model controlling for an increasing number of factors. We then test the robustness of our results to the choice of the weights in the construction of the indices and to the inclusion of several other policy variables.

Table 2 reports the estimated coefficients with bootstrapped standard errors for a series of specifications of the gravity model based on equation (3).[18] The overall results indicate that both TTRI and RPM have a significant effect on trade flows and in the direction one would expect. Bilateral trade flows are found to be negatively correlated with the TTRI and positively correlated with the RPM. More explicitly, specifications (1) and (2) estimate the gravity model with country-year fixed effect accounting for multilateral resistance while controlling for bilateral factors with a series of gravity variables (distance, common border, common language, colonial ties). All coefficients result significant and of the correct sign. The coefficient of the TTRI variable is about

[18] Random drawing from the elasticities distribution, bootstrapping the indices and estimating the gravity model with all fixed effect is quite a computationally intensive procedure. Thus, we report bootstrapped standard error only for our main results of Table 2. For the results of Tables 3 and 4 the robust standard errors are not bootstrapped. Since bootstrapped standard errors are found to be similar in magnitude to heterodasticity robust standard errors, this should not invalidate these results. Also note that bootstrapped standard errors of the indices themselves are not found to be very large as the elasticities used in the construction of the indices are estimated with great precision (Kee, Nicita and Olarreaga, 2008).

minus 1.5 in specification (1) and increases to about minus 1 in specification (2) when the RPM variable is added. In this specification the coefficient on the RPM is about 2.6. This would indicate that relative preferences have a large impact, as a 1 percentage point increase in RPM would increase trade by more than 2.5 percent. This result is reduced when country-pair fixed effects are added in specifications (3) and (4). The lower coefficients suggest an omitted variable bias, as the gravity type variables of specification (2) may not capture the full heterogeneity across countries. The result of specification (3) indicates that bilateral trade flows are estimated to decrease by about one percent for a one percentage point increase in the TTRI at its mean. Part of this effect is transferred to the RPM variable once it is added as in specification (4). In this specification the coefficient on the TTRI is about minus 0.86 while the coefficient on the RPM is about 0.62. In this case the effect on bilateral trade is respectively -0.8 percent and -0.86 percent for each percentage point increase in the TTRI and each percentage point decrease in the RPM.[19] Specification (4) is our preferred one whose results are used to estimate the effects on bilateral trade flows. The final specification (5) derives from the theoretically based robustness check discussed in Section 2.3 and is based on estimating equation (5). As expected, these results are similar to those obtained from the previous specification.

We now turn to the sensitivity analysis of our results. Table 3 reports the estimated coefficients for a series of robustness checks largely related to the choice of variables used in the construction of the indices. All the results so far have been based on indices that are constructed by using fix trade weights averaged for the years 1995-1997. To check the

[19] This is to say that assuming that the one percentage point increase in TTRI taken at its mean translates into a one percentage point decrease in the RPM (i.e. $\frac{\sum_{hs} x_{jk,hs}\varepsilon_{jk,hs}T_{wk,hs}}{\sum_{hs} x_{jk,hs}\varepsilon_{jk,hs}}$, $j \neq k$ remains constant), the impact on trade for a country pair with such characteristics is about 1.7 percent.

extent to which the results are robust to the choice of weights used in the construction of the indices we also estimate our preferred specification using weights based on trade values for the year 2000 and also weights based on average trade values across our period of analysis (2000-2009).[20] The results are reported in columns (1) and (2) respectively.

The indices also depend on import demand elasticities. To check the robustness of the results to the choice of elasticities we estimate the model with indices constructed assuming unitary (or unvarying) elasticities and also by using multilateral elasticities from Kee, Nicita and Olarreaga (2008). The results are reported in columns (3) and (4). A final robustness check regards the use of the year 2009 in the estimating sample. Because of economic turmoil, 2009 was a year in which international trade flows declined quite dramatically. Although this should be captured by importer-year and exporter-year fixed effects, there may be some specific bilateral effects. To check whether these impact our results, column (5) reports the coefficients of the two indices by excluding the year 2009 from the estimating sample. All of these robustness checks do not affect our results in a substantive matter. Both TTRI and RPM remain significant and on the correct sign across all specifications.

A different set of concerns relates to what extent the results are robust to policy related issues. In particular, we are interested in whether our results are affected by preference utilization, PTAs' trade related effects beyond those of tariffs, and exchange rate fluctuations. We also explore the extent to which the RPM variable provides a better fit in explaining bilateral trade than the standard measure of preferential margin simply

[20] This approach increases the number of observations by about 5 percent as it guarantees that the indices are calculated for each observed level of trade.

constructed on the basis of the MFN rate.[21] Table 4 reports these results. We start by replacing the RPM variable with the standard measure of preferential margin in our preferred specification. Estimation results are reported in column (1). They show the lack of significance of the coefficient for the preference margin while the TTRI remains substantially unchanged. The lack of significance is likely driven by some collinearity of the standard preferential margin with the fixed effects. The standard preference margin has a lower degree of variation across country-time (because MFN tariffs may have not changed as much), as well as a lower degree of variation across country-pairs (because MFN rates are uniformly applied to a large number of countries). These impacts are likely to be absorbed by importer-time and country-pair dummies. In any case, the lack of significance for the standard measure of preferential margin implies that it is not suited to properly capture the effect of relative preferences on trade within a well specified gravity model.

Preferential access is often subject to stringent rules and regulations, such as rules of origin (Krishna, 2006) which add to overall trade costs. When the preferential margin is small, the costs of using preferential access often outweigh the benefits, and thus traders find it more economically viable to pay MFN rates rather than to incur the cost associated with the use of the preferential rate. As a test, we check whether our results are robust to this issue by applying the simple rule that preferences are used only when the preferential margin is larger than 2.5 percent (Estevadeordal, Freund and Ornelas. 2008). We recalculate the indices and then re-estimate our preferred specification.[22] These results, provided in column (2), show no substantial difference from those of our preferred specification.

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[21] The standard preferential margin is given by $PM_{jk} = \frac{\sum_{hs} x^{j}_{jk,hs} \varepsilon_{jk,hs} \left(MFN_{k,hs} - T^{j}_{k,hs} \right)}{\sum_{hs} x^{j}_{jk,hs} \varepsilon_{jk,hs}}$

[22] In a large majority of cases the TTRI and RPM resulted very close to the ones calculated on the basis of the applied tariffs. On average, the TTRI corrected for preference utilization is about 0.2 percent higher

Another issue of consideration is the extent to which our results are robust once we explicitly control for the existence of a PTA. We thus re-estimate the model by adding a dummy variable for the presence of PTAs and provide the result in column (3)[23]. The inclusion of the PTA variable does not affect the coefficients on the two indices, and results in an insignificant effect for the PTA. The lack of significance is most likely related to collinearity as country pair fixed effects take most of the explanatory power out of the PTA variable. We thus re-estimate the model substituting country-pair fixed effects with a series of gravity type variables as in the first two specifications of Table 2. The results are shown in column (4). Also in this case the coefficients for our indices do not change significantly with respect to the corresponding specification (2) of Table 2. However, in this case the effect of the PTA is significant. In our period of analysis, the average effect of a PTA is estimated to be about a 35 percent increase in bilateral trade.

One further concern is related to exchange rate fluctuations. Movement tariffs and exchange rates have similar effects on international trade (Feenstra, 1989). Exchange rates varied considerably during our period of analysis and thus our results could be at least partly driven by exchange rate fluctuations. In our specifications, exchange rate movements are largely captured by importer-year and exporter-year fixed effects. Still, there could be some residual effects at the bilateral level. We take this into account by adding the yearly average bilateral exchange rate as a control variable. The results, provided in column (5), do not show a substantial change in the coefficients on the indices, while indicating that a 10 percent depreciation of exporter currency results in an almost 1.2 percent increase in exports.

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than the uncorrected one, while the RPM is substantially unchanged. For only about 1 percent of observations the difference between the two TTRIs was larger than 1 percent.

[23] The data on preferential agreements largely comes from the Jeffrey Bergstrand Database on Economic Integration Agreements available at http://www.nd.edu/~jbergstr/.

4.3. Impact of preferential access on trade flows

In this section we make use of the econometric results to calculate the magnitude of the effect of the system of preferences on trade flows with respect to a scenario based on MFN rates and thus with no discrimination across trading partners.[24] The impact of preferential access on exports for every country is simply calculated as:

$$\sum_k \Delta \ln\left(X_{jk}\right) = \sum_k \beta_1 \Delta \ln\left(1 + TTRI_{jk}\right) + \beta_2 \Delta RPM_{jk} \qquad (6)$$

where $\Delta \ln\left(1 + TTRI_{jk}\right) = \ln(1 + MFN_j) - \ln(1 + TTRI_{jk})$ and $\Delta RPM_{jk} = RPM_{jk}$ since the RPM is equal to zero in a non discriminatory tariff regime. An important issue in the above calculation is how to account for the fact that the MFN liberalization between 2000 and 2009 was, at least in part, a consequence of the proliferation in PTAs. By comparing present market access conditions with those of MFN regimes existing in 2009 we implicitly assume that any MFN liberalization that happened during the period of analysis was not in response to the proliferation of preferential access. This may not be a valid assumption as some of the literature suggests that PTAs contributed to freer MFN trade by acting as a "building block".[25] This MFN liberalization should therefore be included in our calculation as an indirect effect of preferences. On the other hand, by comparing present market access conditions with those of MFN regimes in 2000, the results would be based on the opposite assumption that MFN liberalization was exclusively driven in response to the proliferation of PTAs. This is a similarly unlikely

[24] Results are based on the coefficients obtained in specification (4) of Table 2.

[25] Estevadeordal, Freund and Ornelas (2008) find a 'building block' effect in a sample of ten Latin American countries. Baldwin and Seghezza (2008) find a negative correlation between MFN tariffs and preference margins in their sample of 23 large countries. They conclude that the stumbling block mechanism, if it exists, is not of first order importance.

assumption. However, taken together, these results provide lower and upper bounds of the effect of preferential access on bilateral trade.

On average, the effects of preferential access on trade are not very large, as the difference between MFN and preferential tariffs is not large in many cases.[26]. Across all bilateral trade flows, the average increase in bilateral trade due to the system of preference relative to the MFN scenario is estimated to be between an upper bound of 3.3 percent and a lower bound of 1.2 percent. Still, the results show some variance. For 25 percent of bilateral trade flows the direct effects of preference are quantified to be between 2 and 5 percent. For international trade as a whole, the direct impact of preferential tariffs is quantified to account for an increase between 1.9 and 3 percent, while the relative impact of preferences is zero.

The effect of the system of preferences on trade varies widely among countries. As in the case of the indices, this variance depends on whether the country participates in PTAs as well as on the product composition of its exports. Countries whose major exports are products where MFN tariffs are low do not substantially benefit from free trade agreements even when they are members of many PTAs. On the other hand, countries whose exports tend towards highly protected sectors benefit greatly from PTAs with major trading partners. Table 5 reports the average impact of preferential access for each country in our sample. The table reports the upper and lower bounds of the direct effect of preferences as well as the relative effect which takes into account preferences given to foreign competitors. Some of the large beneficiaries from the preferential tariffs regimes are South and Central American countries. For many of these countries the total effect of the system of preferences is quantified as an increase in export of more than 5 percent. This increase is due to their membership in regional

[26]Given the little difference between preferential tariffs and the MFN rates (2.2 percent in 2009), the effect on trade is on average small.

PTAs, preferential access to the USA, and the high external tariffs that shield internal trade from foreign competitors. Countries enjoying preferential access in high income markets are also those whose benefits are larger. Among these, the largest beneficiaries are some countries in Africa (e.g. Kenya, Malawi, Mauritius, Morocco, Tanzania and Tunisia) and some in Asia (Bangladesh and Sri Lanka). Most of the countries that are members of the EU market also reap large benefits from the system of preferences.

Although the system of preferences always provides amelioration in direct market access conditions, its effects with regard to relative market access conditions are negative for almost one-third of the countries. For these countries, the discriminatory effect of preferences erodes part of the benefits provided by the lower tariffs on their exports, sometimes quite significantly. Moreover, not all countries benefit from the system of preferences. For a small subset of countries (e.g. India, Japan, Korea, and Taiwan) the overall effect of the system of preferences is likely to be negative, as the losses in terms of relative market access conditions are higher than the gains from direct market access conditions.

5. Conclusions

The objective of this paper is to better investigate the extent to which preferential market access affects bilateral trade. In doing so, the paper first provides two indices of market access conditions that take into account the complex structure of tariff preferences. The first index measures direct market access conditions (the overall tariff faced by exports) while the other index measures relative market access conditions (the overall tariff faced by exports relative to that faced by foreign competitors). The tracking of the two indices across our period of analysis (2000 - 2009) indicates that direct market access conditions have generally improved and that relative market

access conditions have become less discriminatory during the period of analysis. While the proliferation of PTAs has had the effect of reducing a large number of bilateral tariffs, the proliferation of PTAs has also eroded some of the large tariff advantages provided by pre-existing PTAs.

The paper continues by estimating a gravity model to quantify the impact of preferential market access on international trade and applies these results to calculate the effect of tariff preferences relative to a non-discriminatory MFN scenario. The results indicate that while direct market access conditions are of primary importance in increasing trade, relative market access conditions also have a significant impact. Since 2000, the system of preferences has contributed to an increase in international trade between 1.9 and 3 percent depending on whether the MFN liberalization that occurred between 2000 and 2009 is assumed, or not, to be consequential to the proliferation of PTAs. At the country level the results show substantial variance. Although the results indicate that the overwhelming majority of countries benefits from the overall system of preferences, some countries see part of these benefits eroded, sometimes substantially, by the deterioration in their relative market access conditions.

References

Anderson, James E. and Peter Neary, 1994. Measuring the restrictiveness of trade policies, World Bank Economic Review, 8(2), 151-169.

Anderson, James E. and Peter Neary, 2003. The mercantilist index of trade policy, International Economic Review, 44(2), 627-649.

Anderson, James E. and Peter Neary, 2005. Measuring Trade Restrictiveness of Trade Policy, Cambridge, Mass. MIT Press, 2005.

Anderson, James E. and Eric vanWincoop, 2003. Gravity with gravitas: a solution to the border puzzle, American Economic Review, 93(1), 70-192.

Baier, Scott L., and Jeffrey H. Bergstrand, 2009. Estimating the effects of free trade agreements on international trade flows using matching econometrics, Journal of International Economics, 77(1), 63-76.

Baier, Scott L., and Jeffrey H. Bergstrand, 2007. Do free trade agreements actually increase members' international trade?, Journal of International Economics, 71(1), 72-95.

Baldwin Richard and Dany Jaimovich, 2010. Are free trade agreements contagious?, CEPR Discussion Papers No. 7904.

Baldwin, Richard and Elena Seghezza, 2008. Are trade blocs building or stumbling blocks? New evidence, CEPR Discussion paper No. 6599.

Bhagwati, Jagdish, 2008. Termites in the Trading System: How Preferential Agreements Undermine Free Trade. Oxford University Press.

Martijn Burger, Frank van Oort and Gert-Jan Linders, 2009. On the specification of the gravity model of trade: zeros, excess zeros and zero-inflated estimation, Spatial Economic Analysis 4, 167-187.

Calvo-Pardo Hector, Caroline Freund and Emanuel Ornelas, 2009. The ASEAN free trade agreement: impact on trade flows and external trade barriers, in: Barro Robert, Lee Jong-Wha (Eds.), Costs and Benefits of Regional Economic Integration. Oxford University Press.

Carrère, Céline, Jaime de Melo, and Bolormaa Tumurchudur, 2008. Disentangling market access effects for ASEAN members under an ASEAN-EU FTA. CEPR Discussion Papers No. 6762.

Carrère, Celine, 2006. Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. European Economic Review, 50(2), 223-247.

Clausing, Kimberly, 2001. Trade creation and trade diversion in the Canada-United States Free Trade Agreement, Canadian Journal of Economics, 34, 678-96.

Estevadeordal, Antoni, Caroline Freund and Emanuel Ornelas, 2008. Does regionalism affect trade liberalization towards non-members?, Quarterly Journal of Economics 123(4), 1531-1575.

Feenstra, Robert, 1995. Estimating the effects of trade policy. In Gene Grossman and Kenneth Rogoff, eds., Handbook of International Economics, 3, Elsevier, Amsterdam.

Feenstra, Robert, 1989. Symmetric pass-through of tariffs and exchange rates under imperfect competition: an empirical test, Journal of International Economics, 27(1-2), 25-45.

Frankel, Jeffrey A., 1997. Regional Trading Blocs, Institute for International Economics, Washington, DC.

Freund Caroline, 2010. Third-country effects of regional trade agreements, The World Economy, 33(11), 1589-1605.

Freund Caroline and Emanuel Ornelas, 2010. Regional trade agreements, Annual Review of Economics, 2(1), 139-166.

Ghosh, Sucharita and Steven Yamarik, 2004. Are regional trading arrangements trade creating?: An application of extreme bounds analysis, Journal of International Economics, 63(2), 369-395.

Grossman, Gene M. and Elhanan Helpman, 1995. The politics of free-trade agreements. American Economic Review 85(4), 667-690.

Helpman, Elhanan, Marc Melitz and Yona Rubinstein, 2008. Estimating trade flows: trading partners and trading volumes, The Quarterly Journal of Economics, 123(2), 441-487.

Hoekman, Bernard, Will Martin and Carlos P. Braga, 2009. Quantifying the value of preferences and potential erosion losses,. in: Bernard M. Hoekman, Will Martin and Carlos Braga (Eds.), Trade Preference Erosion Measurement and Policy Response. Palgrave MacMillan.

Hoekman , Bernard and Alessandro Nicita, 2011. Trade policy, Trade costs, and developing country trade. World Development, (forthcoming),

Kee, Hiau Looi, Cristina Neagu and Alessandro Nicita, 2011. Is protectionism on the rise? Assessing national trade policies during the crisis of 2008, The Review of Economics and Statistics, (forthcoming)

Kee, Hiau Looi, Alessandro Nicita and Marcelo Olarreaga, 2009. Estimating trade restrictiveness indices, Economic Journal, 119(534), 172-199.

Kee, Hiau Looi, Alessandro Nicita and Marcelo Olarreaga, 2008. Import demand elasticities and trade distortions, The Review of Economics and Statistics, 90(4), 666-682.

Kemp, Murray C. and Henry Wan, Jr. 1976. An elementary proposition concerning the formation of customs unions, Journal of International Economics, 6, 95-97.

Krishna, Kala, 2006. Understanding rules of origins, in: Cadot, O., Estevadeordal A., Suwa-Eisenmann A., and Verdier, T. (eds.) The Origin of Goods: Rules of Origin in Regional Trade Agreements. Oxford University Press, 2006.

Krishna, Pravin, 1998. Regionalism and multilateralism: A political economy approach, Quarterly Journal of Economics, 113, 227-252.

Lee Jong-Wha and Shin Kwahno 2006. Does regionalism lead to more global trade integration in East Asia?, North American Journal of Economics and Finance, 17, 283-301.

Linder, Staffan Burenstam. 1961. An Essay on Trade and Transformation. Wiley and Sons. New York.

Linnemann, Hans, 1966. An Econometric Study of International Trade Flows. North-Holland, Amsterdam.

Low Patrick, Roberta Piermartini and Jurgen Richtering, 2009 Multilateral solutions to the erosion of non-reciprocal preferences in NAMA, in: Bernard Hoekman, Will Martin and Carlos Braga (Eds.), Trade Preference Erosion Measurement and Policy Response. Palgrave MacMillan.

Magee, Christopher. 2008. New measures of trade creation and trade diversion, Journal of International Economics, 75(2), 340-62.

Ornelas, Emanuel, 2005. Rent destruction and the political viability of free trade agreements, Quarterly Journal of Economics 120, 1475-1506.

Rauch, James, 1999. Networks versus markets in international trade, Journal of International Economics, 48(1), 7-35.

Robertson, Raymond and Antoni Estevadeordal, 2009. Asymmetric tariffs and multilateral resistance, Cuadernos de Economia Latin American Journal of Economics, 46, 3-31.

Romalis, John, 2007. Market access, openness and growth, NBER Working Paper No. 13048.

Santos Silva Joao and Silvana Tenreyro, 2006. The log of gravity, The Review of Economics and Statistics, 88(4), 641-658.

Trefler, Daniel, 2004. The long and short of the Canada-U. S. Free Trade Agreement, American Economic Review, 94(4), 870-895.

Viner, Jacob, 1950. The Customs Union Issue. Carnegie Endowment for International Peace.

Wonnacott, Paul, and Mark Lutz, 1989. Is there a case for free trade agreements? in: Jeffrey Schott, ed., Free Trade Areas and U.S. Trade Policy, Institute for International Economics: Washington D.C.

Table 1 – Average TTRI and RPM, by country

	TTRI 2000	TTRI 2009	RPM 2000	RPM 2009			TTRI 2000	TTRI 2009	RPM 2000	RPM 2009
Algeria	0.006	0.001	-0.001	0.000		Korea	0.061	0.041	-0.011	-0.012
Argentina	0.066	0.050	0.039	0.032		Latvia	0.021	0.010	-0.002	-0.001
Australia	0.052	0.036	-0.001	-0.001		Lebanon	0.063	0.006	-0.003	0.013
Austria	0.018	0.006	0.006	0.003		Lithuania	0.047	0.011	-0.011	0.006
Azerbaijan	0.071	0.005	-0.002	0.016		Malaysia	0.031	0.013	-0.003	-0.001
Bangladesh	0.051	0.037	0.024	0.012		Mauritius	0.071	0.003	-0.021	0.013
Belgium	0.013	0.004	0.008	0.005		Mexico	0.005	0.002	0.017	0.016
Bolivia	0.003	0.002	0.040	0.018		Morocco	0.084	0.012	-0.026	0.005
Brazil	0.058	0.033	0.014	0.008		Netherlands	0.011	0.007	0.005	0.002
Bulgaria	0.060	0.016	-0.015	0.004		New Zealand	0.041	0.037	-0.005	-0.008
Cameroon	0.022	0.008	-0.003	0.001		Nicaragua	0.044	0.006	0.001	0.023
Canada	0.011	0.007	0.009	0.008		Nigeria	0.021	0.002	-0.001	-0.002
Chile	0.023	0.006	0.005	0.010		Norway	0.006	0.004	0.003	0.001
China	0.040	0.034	-0.005	-0.006		Paraguay	0.011	0.003	0.013	0.019
Colombia	0.024	0.008	0.011	0.014		Peru	0.029	0.009	-0.006	0.008
Costa Rica	0.044	0.004	-0.003	0.012		Philippines	0.026	0.021	0.001	-0.002
Cote d'Ivoire	0.037	0.009	-0.010	0.003		Poland	0.044	0.007	-0.016	0.005
Croatia	0.067	0.006	-0.016	0.003		Portugal	0.008	0.006	0.019	0.011
Czech Rep	0.065	0.005	-0.012	0.004		Romania	0.069	0.015	-0.016	0.015
Denmark	0.015	0.010	0.004	0.002		Russian Fed	0.024	0.015	-0.005	-0.004
Ecuador	0.056	0.028	-0.002	0.008		South Africa	0.028	0.017	-0.004	-0.001
Egypt	0.046	0.023	-0.009	-0.002		Saudi Arabia	0.021	0.007	-0.001	0.000
El Salvador	0.050	0.001	0.008	0.041		Senegal	0.030	0.013	0.033	0.012
Estonia	0.025	0.006	-0.008	0.004		Singapore	0.020	0.006	0.006	0.004
Ethiopia	0.004	0.002	0.002	0.002		Slovakia	0.039	0.006	0.001	0.002
Finland	0.017	0.010	0.001	0.000		Slovenia	0.059	0.006	-0.033	0.003
France	0.019	0.009	0.005	0.003		Spain	0.020	0.010	0.009	0.005
Ghana	0.030	0.008	-0.008	-0.011		Sri Lanka	0.073	0.047	-0.008	0.002
Greece	0.024	0.012	0.014	0.004		Sweden	0.018	0.008	0.002	0.001
Guatemala	0.047	0.011	0.008	0.029		Taiwan	0.051	0.035	-0.008	-0.011
Germany	0.021	0.010	0.005	0.003		Tanzania	0.086	0.016	-0.002	0.006
Honduras	0.061	0.003	-0.003	0.036		Thailand	0.052	0.034	0.000	-0.002
Hong Kong	0.079	0.046	-0.017	-0.009		Trinidad Tbg	0.018	0.002	-0.007	0.001
Hungary	0.045	0.007	-0.013	0.004		Tunisia	0.074	0.004	-0.025	0.014
Iceland	0.014	0.008	0.017	0.008		Turkey	0.077	0.022	-0.028	0.006
India	0.038	0.033	-0.006	-0.014		Uganda	0.026	0.005	-0.002	0.001
Indonesia	0.049	0.034	0.000	-0.002		Untd.Kingdom	0.020	0.010	0.004	0.003
Iran	0.034	0.014	-0.004	-0.003		Uruguay	0.024	0.019	0.045	0.041
Ireland	0.009	0.011	0.006	0.002		USA	0.044	0.035	0.005	0.001
Israel	0.011	0.005	0.007	0.004		Venezuela	0.013	0.002	0.009	0.008
Italy	0.025	0.014	0.007	0.004		Zambia	0.061	0.010	0.005	-0.001
Japan	0.054	0.037	-0.013	-0.014						
Jordan	0.056	0.016	-0.003	0.004						
Kazakstan	0.037	0.009	0.000	0.008		Simple Avg	0.037	0.014	0.000	0.006
Kenya	0.048	0.008	0.000	0.030		Weighted Avg	0.033	0.020	0.001	0.001

Table 2 - Gravity Model Results

Dependent variable: Natural log of export

	(1)	(2)	(3)	(4)	(5)
Ln(1+TTRI)	-1.530***	-0.979***	-1.003***	-0.857***	-0.886***
	(0.119)	(0.116)	(0.099)	(0.100)	(0.114)
RPM		2.601***		0.625***	0.675**
		(0.265)		(0.204)	(0.274)
Ln Distance	-1.298***	-1.287***			
	(0.017)	(0.017)			
Shared Border	0.347***	0.324***			
	(0.042)	(0.042)			
Same Language	0.643***	0.632***			
	(0.031)	(0.031)			
Ex-Colony	0.462***	0.479***			
	(0.032)	(0.032)			
Importer-Year f.e.	yes	yes	yes	yes	yes
Exporter-Year f.e.	yes	yes	yes	yes	yes
Importer-Exporter f.e.	no	no	yes	yes	yes
Observations	65007	65007	65007	65007	65007
R^2	0.822	0.829	0.919	0.928	0.926

Note: Bootstrapped robust standard errors in parentheses - * p < 0.10, ** p < 0.05, *** p < 0.01

Table 3 – Robustness Results on Indices

Dependent variable: Natural log of export

	(1)	(2)	(3)	(4)	(5)
	Fix Weights Year 2000	Fix Weights 00-09 Avg.	Unitary Elasticities	Multilateral Elasticities	No Year 2009
Ln(1+TTRI)	-0.988***	-1.635***	-0.851***	-0.874***	-0.831***
	(0.095)	(0.096)	(0.213)	(0.215)	(0.217)
RPM	0.282*	0.443***	0.697**	0.595*	0.643**
	(0.152)	(0.169)	(0.320)	(0.321)	(0.327)
Observations	63728	73190	65007	65007	58429
R^2	0.913	0.925	0.919	0.924	0.923

Notes: All specifications include Importer-Year, Exporter-Year, and Importer-Exporter fixed effects
Robust standard errors in parentheses - * p < 0.10, ** p < 0.05, *** p < 0.01

Table 4 – Robustness Results on Policy

Dependent variable: Natural log of export

	(1)	(2)	(3)	(4)	(5)
	Preference Utilization diff. > 2.5%	Standard Preferential Margin	PTA	PTA no imp.-exp. f.e.	Exchange Rate
Ln(1+TTRI)	-0.867***	-1.100***	-0.856***	-0.956***	-0.879***
	(0.215)	(0.210)	(0.213)	(0.126)	(0.214)
RPM	0.694**		0.621*	2.238***	0.633**
	(0.333)		(0.318)	(0.266)	(0.319)
Standard Preferential Margin		-0.0896			
		(0.242)			
PTA			0.0351	0.300***	
			(0.034)	(0.030)	
Log Exchange Rate					0.116***
					(0.022)
Observations	65007	65007	65007	65007	65007
R^2	0.922	0.913	0.928	0.825	0.925

Notes: Robust standard errors in parentheses - * p < 0.10, ** p < 0.05, *** p < 0.01

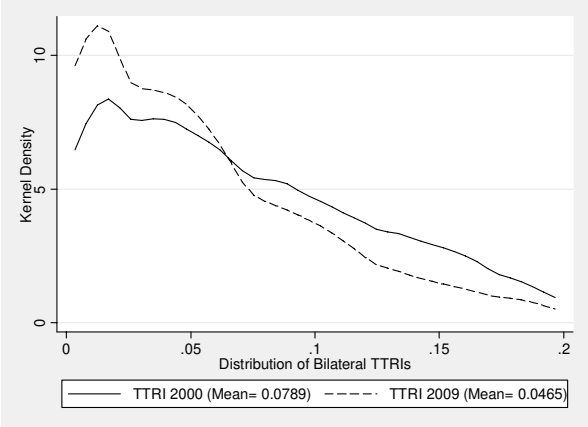
All specifications but (4) include Importer-Year, Exporter-Year, and Importer-Exporter fixed effects.

Specification (4) includes gravity type variables as in Table 1. Those variables are not reported here for brevity.

Table 5 – Trade Effects of the System of Preference (% change in trade)

	TTRI (upper bound)	TTRI (lower bound)	RPM				TTRI (upper bound)	TTRI (lower bound)	RPM
Algeria	0.58%	0.30%	0.01%			Korea	1.44%	0.14%	-0.77%
Argentina	5.56%	3.85%	1.97%			Latvia	1.28%	1.15%	-0.04%
Australia	1.91%	0.24%	-0.04%			Lebanon	3.97%	1.81%	0.82%
Austria	3.10%	2.03%	0.21%			Lithuania	3.26%	2.60%	0.35%
Azerbaijan	3.68%	2.00%	1.00%			Malaysia	1.00%	0.37%	-0.09%
Bangladesh	4.01%	3.36%	0.75%			Mauritius	5.00%	4.59%	0.79%
Belgium	3.57%	2.61%	0.28%			Mexico	2.22%	2.02%	0.98%
Bolivia	3.87%	2.43%	1.13%			Morocco	5.16%	4.02%	0.32%
Brazil	3.71%	1.83%	0.51%			Netherlands	4.06%	3.54%	0.12%
Bulgaria	3.63%	2.16%	0.26%			New Zealand	0.93%	0.50%	-0.53%
Cameroon	1.08%	0.99%	0.07%			Nicaragua	4.46%	3.96%	1.44%
Canada	1.68%	1.25%	0.49%			Nigeria	0.80%	0.04%	-0.12%
Chile	2.40%	1.51%	0.60%			Norway	1.18%	0.88%	0.08%
China	0.77%	0.42%	-0.40%			Paraguay	3.89%	3.16%	1.18%
Colombia	3.03%	2.38%	0.89%			Peru	2.45%	2.00%	0.48%
Costa Rica	4.63%	4.24%	0.75%			Philippines	0.90%	0.56%	-0.12%
Cote d'Ivoire	2.29%	1.81%	0.21%			Poland	2.76%	2.18%	0.31%
Croatia	4.67%	2.63%	0.18%			Portugal	4.04%	3.75%	0.67%
Czech Rep	4.72%	2.05%	0.24%			Romania	4.89%	3.38%	0.91%
Denmark	3.03%	2.34%	0.13%			Russian Fed	0.88%	0.22%	-0.24%
Ecuador	3.75%	3.52%	0.48%			South Africa	1.16%	0.50%	-0.09%
Egypt	2.34%	1.80%	-0.10%			Saudi Arabia	0.76%	0.12%	-0.02%
El Salvador	5.13%	4.55%	2.57%			Senegal	5.80%	4.69%	0.77%
Estonia	2.06%	1.57%	0.25%			Singapore	1.45%	0.79%	0.24%
Ethiopia	0.81%	0.49%	0.10%			Slovakia	4.10%	2.04%	0.14%
Finland	1.63%	0.74%	0.02%			Slovenia	3.46%	2.33%	0.20%
France	2.97%	2.09%	0.20%			Spain	3.83%	3.06%	0.33%
Ghana	1.75%	1.30%	-0.69%			Sri Lanka	2.34%	1.84%	0.15%
Greece	4.11%	3.25%	0.28%			Sweden	2.28%	1.19%	0.09%
Guatemala	4.17%	3.77%	1.83%			Taiwan	1.04%	0.02%	-0.68%
Germany	3.01%	2.07%	0.20%			Tanzania	4.19%	1.51%	0.37%
Honduras	5.06%	4.64%	2.24%			Thailand	1.93%	1.11%	-0.10%
Hong Kong	2.18%	0.60%	-0.58%			Trinidad Tbg	1.64%	0.72%	0.05%
Hungary	3.50%	2.10%	0.28%			Tunisia	5.33%	4.55%	0.87%
Iceland	4.33%	3.55%	0.47%			Turkey	4.20%	3.30%	0.36%
India	0.75%	0.22%	-0.85%			Uganda	2.64%	1.42%	0.09%
Indonesia	1.55%	0.85%	-0.10%			Untd.Kingdom	2.40%	1.54%	0.16%
Iran	1.21%	0.14%	-0.19%			Uruguay	6.01%	5.24%	2.57%
Ireland	1.82%	1.29%	0.14%			USA	2.33%	1.14%	0.04%
Israel	1.70%	1.07%	0.23%			Venezuela	1.97%	0.97%	0.50%
Italy	3.01%	2.15%	0.22%			Zambia	4.21%	0.36%	-0.08%
Japan	1.04%	0.05%	-0.89%						
Jordan	3.16%	0.55%	0.25%						
Kazakstan	2.47%	1.89%	0.48%			Simple Avg	2.87%	1.95%	0.35%
Kenya	3.81%	3.57%	1.86%			Weighted Avg	2.25%	1.37%	0.00%

Figure 1 - Distribution of Direct (TTRI) and Relative (RPM) Market Access Indices (2000 and 2009, bilateral)



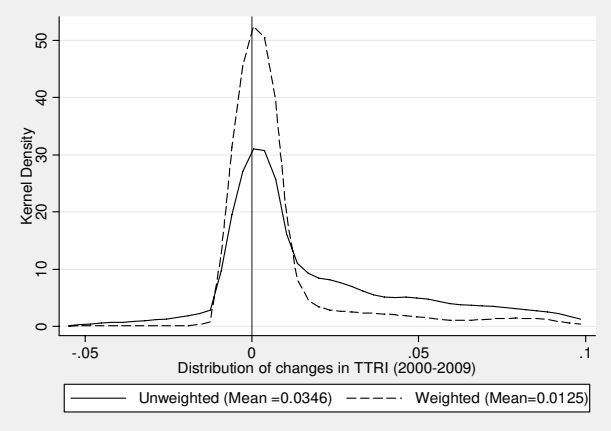
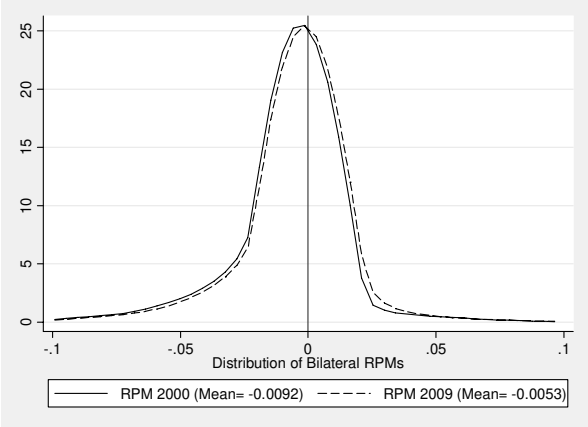


Figure 2 - Distribution of changes in TTRI and RPM (2000 – 2009, bilateral)



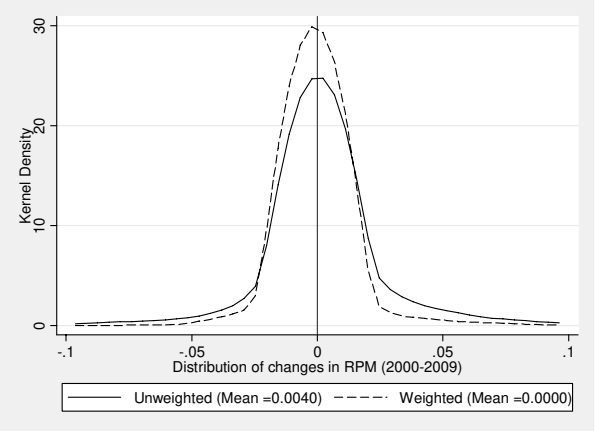
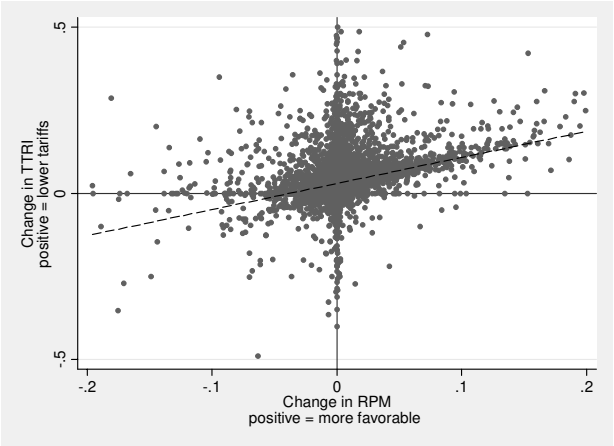


Figure 3 - Correlation in the changes of TTRI and RPM (2000 – 2009, bilateral)



ADDITIONAL TABLES – Not to be published

Table A1 – TTRI and RPM (with their bootstrapped standard errors)

	TTRI 2000	TTRI 2001 SD	RPM 2000	RPM 2000 SD	TTRI 2009	TTRI 2009 SD	RPM 2009	RPM 2009 SD
Algeria	0.006	(0.000)	0.000	(0.000)	0.001	(0.000)	0.000	(0.000)
Argentina	0.083	(0.009)	0.037	(0.008)	0.059	(0.006)	0.024	(0.008)
Australia	0.056	(0.014)	-0.001	(0.001)	0.039	(0.012)	-0.001	(0.001)
Austria	0.018	(0.001)	0.006	(0.001)	0.006	(0.001)	0.003	(0.000)
Bangladesh	0.053	(0.008)	0.025	(0.004)	0.040	(0.007)	0.012	(0.005)
Belgium	0.013	(0.001)	0.008	(0.002)	0.005	(0.001)	0.005	(0.001)
Benin	0.082	(0.008)	-0.011	(0.001)	0.028	(0.001)	-0.013	(0.001)
Bolivia	0.004	(0.001)	0.036	(0.003)	0.002	(0.000)	0.019	(0.001)
Brazil	0.062	(0.011)	0.014	(0.002)	0.037	(0.006)	0.007	(0.003)
Bulgaria	0.061	(0.010)	-0.016	(0.007)	0.016	(0.002)	0.004	(0.002)
Cameroon	0.019	(0.002)	-0.001	(0.001)	0.009	(0.001)	0.001	(0.000)
Canada	0.012	(0.001)	0.008	(0.002)	0.007	(0.001)	0.007	(0.002)
Chile	0.024	(0.002)	0.005	(0.003)	0.006	(0.001)	0.010	(0.002)
China	0.042	(0.007)	-0.005	(0.002)	0.035	(0.006)	-0.007	(0.002)
Colombia	0.025	(0.003)	0.011	(0.001)	0.009	(0.003)	0.014	(0.003)
Costa Rica	0.047	(0.011)	-0.003	(0.003)	0.004	(0.000)	0.014	(0.003)
Cote d'Ivoire	0.038	(0.002)	-0.009	(0.001)	0.010	(0.000)	0.003	(0.000)
Croatia	0.066	(0.005)	-0.015	(0.002)	0.009	(0.001)	0.003	(0.001)
Czech Rep	0.064	(0.012)	-0.012	(0.006)	0.005	(0.001)	0.004	(0.002)
Denmark	0.014	(0.002)	0.005	(0.001)	0.009	(0.001)	0.003	(0.001)
Ecuador	0.056	(0.002)	-0.004	(0.002)	0.028	(0.002)	0.008	(0.001)
Egypt	0.052	(0.007)	-0.009	(0.004)	0.027	(0.005)	-0.002	(0.005)
El Salvador	0.059	(0.008)	0.001	(0.005)	0.001	(0.001)	0.042	(0.002)
Estonia	0.030	(0.004)	-0.011	(0.002)	0.006	(0.000)	0.005	(0.002)
Ethiopia	0.004	(0.000)	0.001	(0.000)	0.003	(0.000)	0.001	(0.000)
Finland	0.017	(0.001)	0.001	(0.001)	0.010	(0.001)	0.000	(0.001)
France	0.019	(0.004)	0.006	(0.001)	0.009	(0.001)	0.003	(0.001)
Gabon	0.004	(0.000)	0.000	(0.000)	0.002	(0.000)	-0.001	(0.000)
Ghana	0.026	(0.004)	-0.006	(0.002)	0.008	(0.001)	-0.012	(0.002)
Greece	0.022	(0.003)	0.015	(0.003)	0.010	(0.001)	0.005	(0.001)
Guatemala	0.054	(0.008)	0.008	(0.005)	0.014	(0.002)	0.033	(0.003)
Germany	0.021	(0.002)	0.005	(0.002)	0.010	(0.001)	0.003	(0.001)
Honduras	0.068	(0.020)	-0.006	(0.011)	0.004	(0.001)	0.037	(0.005)
Hong Kong	0.081	(0.006)	-0.015	(0.002)	0.047	(0.005)	-0.008	(0.003)
Hungary	0.046	(0.006)	-0.013	(0.005)	0.007	(0.001)	0.004	(0.001)
Iceland	0.014	(0.001)	0.017	(0.002)	0.009	(0.001)	0.008	(0.002)
India	0.041	(0.006)	-0.007	(0.002)	0.036	(0.006)	-0.014	(0.003)
Indonesia	0.049	(0.008)	-0.001	(0.002)	0.034	(0.007)	-0.003	(0.003)
Iran	0.034	(0.003)	-0.003	(0.001)	0.017	(0.004)	-0.004	(0.001)
Ireland	0.008	(0.001)	0.006	(0.001)	0.010	(0.002)	0.003	(0.001)
Israel	0.011	(0.001)	0.008	(0.002)	0.005	(0.001)	0.005	(0.001)
Italy	0.025	(0.002)	0.007	(0.003)	0.013	(0.001)	0.004	(0.001)
Jamaica	0.054	(0.024)	-0.017	(0.010)	0.027	(0.023)	-0.016	(0.018)
Japan	0.055	(0.005)	-0.012	(0.003)	0.038	(0.003)	-0.014	(0.002)
Jordan	0.057	(0.009)	-0.003	(0.002)	0.015	(0.001)	0.005	(0.001)
Kazakstan	0.038	(0.002)	0.000	(0.000)	0.007	(0.001)	0.008	(0.001)

Table A1 (cont.) – TTRI and RPM (with their bootstrapped standard errors)

	TTRI 2000	TTRI 2001 SD	RPM 2000	RPM 2000 SD	TTRI 2009	TTRI 2009 SD	RPM 2009	RPM 2009 SD
Kenya	0.051	(0.007)	0.000	(0.003)	0.008	(0.001)	0.038	(0.005)
Korea	0.062	(0.012)	-0.011	(0.003)	0.041	(0.008)	-0.012	(0.003)
Latvia	0.021	(0.002)	-0.002	(0.001)	0.012	(0.001)	0.000	(0.002)
Lebanon	0.069	(0.004)	-0.003	(0.001)	0.007	(0.001)	0.013	(0.001)
Lithuania	0.047	(0.007)	-0.012	(0.006)	0.010	(0.002)	0.005	(0.002)
Madagascar	0.018	(0.002)	0.028	(0.003)	0.008	(0.000)	0.012	(0.001)
Malawi	0.212	(0.005)	-0.014	(0.001)	0.086	(0.001)	0.044	(0.002)
Malaysia	0.029	(0.005)	-0.003	(0.001)	0.012	(0.004)	-0.002	(0.002)
Mauritius	0.084	(0.011)	-0.025	(0.004)	0.003	(0.000)	0.017	(0.005)
Mexico	0.005	(0.000)	0.018	(0.004)	0.002	(0.000)	0.017	(0.002)
Morocco	0.084	(0.011)	-0.025	(0.006)	0.012	(0.006)	0.004	(0.007)
Mozambique	0.046	(0.001)	0.012	(0.000)	0.003	(0.000)	0.004	(0.000)
Netherlands	0.010	(0.001)	0.006	(0.001)	0.006	(0.001)	0.003	(0.001)
New Zealand	0.046	(0.006)	-0.004	(0.002)	0.042	(0.007)	-0.008	(0.002)
Nicaragua	0.046	(0.012)	0.001	(0.002)	0.007	(0.002)	0.023	(0.007)
Nigeria	0.021	(0.002)	-0.001	(0.000)	0.004	(0.000)	-0.002	(0.000)
Norway	0.006	(0.001)	0.003	(0.001)	0.004	(0.001)	0.001	(0.001)
Oman	0.017	(0.001)	-0.001	(0.000)	0.007	(0.000)	0.000	(0.000)
Pakistan	0.071	(0.007)	-0.014	(0.003)	0.056	(0.006)	-0.016	(0.004)
Paraguay	0.009	(0.001)	0.009	(0.005)	0.002	(0.000)	0.010	(0.004)
Peru	0.031	(0.006)	-0.007	(0.003)	0.009	(0.001)	0.008	(0.003)
Philippines	0.025	(0.005)	0.001	(0.001)	0.020	(0.004)	-0.002	(0.002)
Poland	0.045	(0.007)	-0.016	(0.007)	0.007	(0.001)	0.005	(0.002)
Portugal	0.008	(0.001)	0.020	(0.002)	0.006	(0.001)	0.011	(0.001)
Romania	0.071	(0.006)	-0.016	(0.005)	0.016	(0.002)	0.015	(0.004)
Russia	0.024	(0.004)	-0.004	(0.001)	0.019	(0.002)	-0.004	(0.001)
South Africa	0.030	(0.004)	-0.004	(0.001)	0.018	(0.002)	-0.001	(0.001)
Saudi Arabia	0.021	(0.001)	-0.001	(0.001)	0.006	(0.000)	0.000	(0.000)
Senegal	0.033	(0.001)	0.024	(0.005)	0.015	(0.001)	0.011	(0.002)
Singapore	0.021	(0.003)	0.006	(0.001)	0.007	(0.001)	0.004	(0.001)
Slovakia	0.038	(0.002)	0.001	(0.002)	0.006	(0.001)	0.002	(0.001)
Slovenia	0.059	(0.003)	-0.032	(0.002)	0.007	(0.002)	0.003	(0.001)
Spain	0.020	(0.002)	0.009	(0.002)	0.010	(0.001)	0.005	(0.002)
Sri Lanka	0.074	(0.005)	-0.008	(0.002)	0.047	(0.003)	0.002	(0.003)
Sweden	0.019	(0.001)	0.002	(0.001)	0.008	(0.001)	0.001	(0.000)
Taiwan	0.051	(0.004)	-0.007	(0.001)	0.035	(0.003)	-0.010	(0.001)
Tanzania	0.085	(0.002)	-0.002	(0.001)	0.015	(0.001)	0.007	(0.002)
Thailand	0.049	(0.015)	0.000	(0.002)	0.033	(0.013)	-0.002	(0.002)
Togo	0.095	(0.001)	-0.007	(0.001)	0.023	(0.000)	-0.001	(0.000)
Trinidad Tbg	0.016	(0.001)	0.014	(0.001)	0.002	(0.000)	0.021	(0.001)
Tunisia	0.075	(0.006)	-0.025	(0.003)	0.005	(0.000)	0.014	(0.002)
Turkey	0.075	(0.007)	-0.027	(0.005)	0.021	(0.003)	0.006	(0.004)
Uganda	0.026	(0.001)	-0.002	(0.001)	0.005	(0.000)	0.001	(0.000)
Untd.Kingdom	0.019	(0.002)	0.004	(0.002)	0.010	(0.001)	0.003	(0.001)
Uruguay	0.026	(0.003)	0.040	(0.007)	0.021	(0.002)	0.036	(0.006)
USA	0.043	(0.008)	0.006	(0.006)	0.034	(0.005)	0.001	(0.003)
Venezuela	0.013	(0.001)	0.008	(0.001)	0.002	(0.000)	0.008	(0.001)
Zambia	0.062	(0.001)	0.006	(0.001)	0.011	(0.000)	-0.001	(0.000)

Table A2– TTRI and RPM with preference utilization only if margin from MFN is larger than 2.5 percentage points (and their difference from uncorrected statistics)

	TTRI 2000 (2.5%)	difference	TTRI 2009 (2.5%)	difference	RPM2000 (2.5%)	difference	RPM 2009 (2.5%)	difference
Algeria	0.007	(0.002)	0.002	(0.001)	-0.001	-(0.001)	-0.001	-(0.001)
Argentina	0.084	(0.001)	0.060	(0.001)	0.036	(0.000)	0.023	-(0.001)
Australia	0.056	(0.000)	0.039	(0.000)	-0.001	(0.000)	0.000	(0.000)
Austria	0.018	(0.000)	0.007	(0.000)	0.006	(0.000)	0.003	(0.000)
Bangladesh	0.053	(0.000)	0.041	(0.000)	0.028	(0.003)	0.014	(0.002)
Belgium	0.014	(0.000)	0.005	(0.000)	0.009	(0.000)	0.005	(0.000)
Benin	0.083	(0.001)	0.030	(0.002)	-0.011	(0.000)	-0.013	(0.000)
Bolivia	0.004	(0.000)	0.003	(0.001)	0.036	(0.000)	0.019	(0.000)
Brazil	0.063	(0.001)	0.037	(0.001)	0.014	(0.000)	0.007	(0.000)
Bulgaria	0.062	(0.001)	0.016	(0.000)	-0.015	(0.001)	0.005	(0.000)
Cameroon	0.021	(0.002)	0.011	(0.002)	-0.002	(0.000)	0.000	(0.000)
Canada	0.014	(0.003)	0.009	(0.002)	0.007	-(0.001)	0.006	-(0.001)
Chile	0.025	(0.002)	0.008	(0.002)	0.005	(0.000)	0.009	-(0.001)
China	0.043	(0.001)	0.036	(0.002)	-0.006	-(0.001)	-0.008	-(0.001)
Colombia	0.026	(0.001)	0.009	(0.001)	0.011	(0.000)	0.014	(0.000)
Costa Rica	0.052	(0.005)	0.006	(0.001)	-0.004	-(0.001)	0.014	(0.000)
Cote d'Ivoire	0.040	(0.002)	0.012	(0.002)	-0.010	-(0.001)	0.001	-(0.002)
Croatia	0.073	(0.007)	0.010	(0.002)	-0.020	-(0.005)	0.002	-(0.001)
Czech Rep	0.065	(0.001)	0.005	(0.000)	-0.012	(0.000)	0.004	(0.000)
Denmark	0.014	(0.000)	0.009	(0.000)	0.005	(0.000)	0.003	(0.000)
Ecuador	0.059	(0.003)	0.029	(0.000)	-0.004	-(0.001)	0.008	(0.000)
Egypt	0.054	(0.002)	0.027	(0.000)	-0.010	-(0.001)	-0.002	(0.000)
El Salvador	0.060	(0.001)	0.002	(0.000)	0.001	(0.000)	0.042	(0.000)
Estonia	0.036	(0.005)	0.006	(0.000)	-0.014	-(0.004)	0.005	(0.001)
Ethiopia	0.006	(0.002)	0.004	(0.001)	0.000	-(0.001)	0.000	(0.000)
Finland	0.018	(0.000)	0.010	(0.000)	0.002	(0.000)	0.000	(0.000)
France	0.019	(0.000)	0.010	(0.000)	0.006	(0.000)	0.003	(0.000)
Gabon	0.004	(0.000)	0.002	(0.000)	0.000	(0.000)	-0.001	(0.000)
Ghana	0.029	(0.003)	0.010	(0.003)	-0.007	-(0.001)	-0.012	(0.000)
Greece	0.022	(0.000)	0.010	(0.000)	0.016	(0.001)	0.006	(0.001)
Guatemala	0.056	(0.002)	0.014	(0.001)	0.007	-(0.001)	0.033	(0.000)
Germany	0.021	(0.000)	0.010	(0.000)	0.005	(0.000)	0.003	(0.000)
Honduras	0.069	(0.001)	0.004	(0.001)	-0.006	(0.000)	0.037	(0.000)
Hong Kong	0.081	(0.000)	0.047	(0.000)	-0.015	(0.001)	-0.007	(0.001)
Hungary	0.046	(0.001)	0.008	(0.000)	-0.012	(0.001)	0.005	(0.000)
Iceland	0.014	(0.000)	0.008	-(0.001)	0.018	(0.001)	0.008	(0.001)
India	0.043	(0.003)	0.036	(0.000)	-0.009	-(0.002)	-0.014	(0.001)
Indonesia	0.051	(0.002)	0.037	(0.002)	-0.002	-(0.001)	-0.004	-(0.001)
Iran	0.035	(0.001)	0.018	(0.001)	-0.004	-(0.001)	-0.005	-(0.001)
Ireland	0.008	(0.000)	0.010	(0.000)	0.006	(0.000)	0.003	(0.000)
Israel	0.013	(0.001)	0.006	(0.001)	0.008	-(0.001)	0.004	-(0.001)
Italy	0.025	(0.000)	0.014	(0.000)	0.008	(0.000)	0.004	(0.000)
Jamaica	0.056	(0.002)	0.027	(0.000)	-0.018	-(0.001)	-0.016	(0.000)
Japan	0.055	(0.000)	0.038	(0.000)	-0.011	(0.001)	-0.014	(0.001)
Jordan	0.058	(0.001)	0.015	(0.001)	-0.004	-(0.001)	0.005	(0.000)
Kazakstan	0.039	(0.001)	0.007	(0.000)	0.000	(0.000)	0.009	(0.000)

Table A2 (cont.) – TTRI and RPM with preference utilization only if margin from MFN is larger than 2.5 percentage points (and their difference from uncorrected statistics)

	TTRI 2000 (2.5%)	difference	TTRI 2009 (2.5%)	difference	RPM2000 (2.5%)	difference	RPM 2009 (2.5%)	difference
Kenya	0.053	(0.002)	0.009	(0.001)	-0.001	-(0.002)	0.036	-(0.001)
Korea	0.062	(0.000)	0.041	(0.000)	-0.011	(0.000)	-0.012	(0.001)
Latvia	0.023	(0.002)	0.012	(0.000)	-0.003	-(0.001)	0.000	(0.000)
Lebanon	0.072	(0.002)	0.007	(0.000)	-0.005	-(0.002)	0.012	(0.000)
Lithuania	0.054	(0.007)	0.011	(0.000)	-0.017	-(0.005)	0.006	(0.001)
Madagascar	0.019	(0.001)	0.009	(0.001)	0.030	(0.001)	0.011	(0.000)
Malawi	0.212	(0.000)	0.086	(0.000)	-0.014	(0.000)	0.044	(0.000)
Malaysia	0.030	(0.001)	0.013	(0.001)	-0.003	(0.000)	-0.001	(0.000)
Mauritius	0.094	(0.010)	0.003	(0.000)	-0.032	-(0.007)	0.018	(0.001)
Mexico	0.008	(0.003)	0.005	(0.003)	0.017	-(0.002)	0.015	-(0.001)
Morocco	0.092	(0.009)	0.013	(0.001)	-0.031	-(0.005)	0.008	(0.003)
Mozambique	0.046	(0.000)	0.004	(0.001)	0.012	(0.000)	0.008	(0.005)
Netherlands	0.010	(0.000)	0.006	(0.000)	0.006	(0.000)	0.003	(0.000)
New Zealand	0.046	(0.000)	0.042	(0.000)	-0.003	(0.000)	-0.007	(0.001)
Nicaragua	0.048	(0.002)	0.008	(0.000)	0.000	-(0.001)	0.023	(0.000)
Nigeria	0.021	(0.000)	0.004	(0.000)	-0.001	(0.000)	-0.001	(0.002)
Norway	0.006	(0.000)	0.004	(0.000)	0.003	(0.000)	0.002	(0.000)
Oman	0.017	(0.000)	0.007	(0.000)	-0.001	(0.000)	0.000	(0.000)
Pakistan	0.075	(0.004)	0.063	(0.007)	-0.017	-(0.003)	-0.021	-(0.005)
Paraguay	0.010	(0.000)	0.002	(0.000)	0.009	(0.000)	0.010	(0.000)
Peru	0.032	(0.002)	0.010	(0.001)	-0.007	(0.000)	0.008	(0.000)
Philippines	0.026	(0.001)	0.021	(0.001)	0.000	-(0.001)	-0.002	-(0.001)
Poland	0.045	(0.000)	0.007	(0.000)	-0.015	(0.001)	0.005	(0.001)
Portugal	0.008	(0.000)	0.006	(0.000)	0.022	(0.002)	0.012	(0.001)
Romania	0.072	(0.000)	0.017	(0.000)	-0.014	(0.002)	0.016	(0.001)
Russia	0.025	(0.001)	0.019	(0.000)	-0.005	-(0.001)	-0.004	(0.000)
South Africa	0.032	(0.002)	0.019	(0.001)	-0.006	-(0.001)	-0.002	-(0.001)
Saudi Arabia	0.021	(0.000)	0.006	(0.000)	-0.001	(0.000)	0.000	(0.000)
Senegal	0.033	(0.000)	0.016	(0.001)	0.025	(0.001)	0.010	-(0.001)
Singapore	0.022	(0.000)	0.007	(0.000)	0.006	(0.000)	0.004	(0.000)
Slovakia	0.040	(0.002)	0.006	(0.000)	0.000	-(0.001)	0.003	(0.000)
Slovenia	0.059	(0.000)	0.007	(0.000)	-0.032	(0.001)	0.004	(0.001)
Spain	0.020	(0.000)	0.010	(0.000)	0.010	(0.000)	0.005	(0.000)
Sri Lanka	0.076	(0.003)	0.048	(0.001)	-0.010	-(0.002)	0.002	(0.000)
Sweden	0.019	(0.000)	0.008	(0.000)	0.002	(0.000)	0.001	(0.000)
Taiwan	0.051	(0.000)	0.035	(0.000)	-0.007	(0.000)	-0.009	(0.001)
Tanzania	0.085	(0.000)	0.015	(0.001)	-0.002	(0.000)	0.003	-(0.004)
Thailand	0.050	(0.001)	0.034	(0.002)	-0.001	-(0.001)	-0.003	-(0.001)
Togo	0.095	(0.000)	0.023	(0.000)	-0.007	(0.000)	-0.001	(0.000)
Trinidad Tbg	0.020	(0.004)	0.002	(0.000)	0.012	-(0.002)	0.021	(0.000)
Tunisia	0.087	(0.012)	0.006	(0.002)	-0.033	-(0.008)	0.015	(0.000)
Turkey	0.076	(0.000)	0.022	(0.001)	-0.026	(0.002)	0.006	(0.000)
Uganda	0.026	(0.000)	0.005	(0.000)	-0.002	(0.000)	0.001	(0.000)
Untd.Kingdom	0.020	(0.000)	0.010	(0.000)	0.004	(0.000)	0.003	(0.000)
Uruguay	0.027	(0.001)	0.021	(0.001)	0.040	(0.000)	0.036	(0.000)
USA	0.043	(0.000)	0.035	(0.000)	0.006	(0.000)	0.001	(0.000)
Venezuela	0.014	(0.000)	0.002	(0.000)	0.009	(0.000)	0.008	(0.000)
Zambia	0.066	(0.004)	0.012	(0.000)	0.003	-(0.003)	0.000	(0.002)