

## DO NONRECIPROCAL PREFERENCE REGIMES INCREASE EXPORTS?

Salvador Gil-Pareja \*

Rafael Llorca-Vivero

José Antonio Martínez-Serrano

*University of Valencia*

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### Abstract

This paper investigates whether and to what extent nonreciprocal preference regimes have increased developing countries' exports to richer countries. Moreover, it analyzes how they have affected donors' exports to beneficiary countries. Using recent developments in the econometric analysis of the gravity equation over the period 1990-2008, we find robust evidence that, on the whole, nonreciprocal preference regimes and GSP schemes have had an economically significant effect on exports from developing countries. However, the estimation of catch-all dummies masks heterogeneous results for the individual schemes. Finally, we find that nonreciprocal regimes have also increased exports from donors to beneficiary countries.

Key words: Nonreciprocal preference regimes; GSP; EBA; AGOA; developing countries.

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\*Corresponding author. Facultad de Economía, Departamento de Estructura Económica, Av. de los Naranjos s/n, C.P. 46022, Valencia, Spain. Email: [Salvador.Gil-Pareja@uv.es](mailto:Salvador.Gil-Pareja@uv.es); Tel. 34963828349. Fax 34963828354.

## **1. Introduction**

The increase of exports from developing countries to industrialized nations' markets has long been considered an essential element to reduce poverty, promote sustainable development and reap the potential benefits of globalization for the developing world. While there has been an intense debate in policy-making circles on how best to accomplish these aims, the prevailing approach has implied that developed countries give support to the integration of developing countries into the world economy through an "special and differential treatment" (in the form of nonreciprocal preferences) for imports from the developing world. The leading instrument for such trade preferences has been the Generalized System of Preferences, but there exist other unilateral (nonreciprocal) preference regimes that are part of this approach.

The Generalized System of Preferences (GSP) is an exception to the GATT principles of reciprocity and nondiscrimination emerged in second half of the 1960s, through which developed countries provide preferential access to their markets to a large number of developing countries and territories. Australia was the first developed country authorized to establish a GSP for developing countries, and since the early 1970s other developed countries followed in Australia footsteps (EU's countries, US, Canada or New Zealand, among others).

In addition to the standard GSP schemes, the EU and the US have signed other preference regimes with poor countries. On the one hand, the Cotonou Agreement (also known as ACP-EU Partnership Agreement) is the most comprehensive partnership agreement between developing countries from Africa, the Caribbean and the Pacific (ACP) and the European Union (EU). The basic principle of Cotonou Agreement (henceforth ACP-EU) is that, with some exceptions, the ACP countries' industrial exports have duty- and quota- free access to the EU market. Another preference regime,

that forms part of the EU's GSP scheme, is the Everything But Arms (EBA) arrangement, which provide unilateral trade preferences to the EU market for products from the 49 Least Developed Countries (LDCs). On the other hand, besides the United States' GSP program (that started in 1976), the US administration also grants other, more recent, nonreciprocal preference regimes including the Caribbean Basin Initiative (CBI), the Andean Trade Preference Act (ATPA) and the African Growth and Opportunity Act (AGOA).

This paper investigates whether and to what extent unilateral preference regimes (UPRs) have increased developing countries' exports. Moreover, it also analyzes how they have affected donors' own export performance to the corresponding beneficiary countries. GSP and other unilateral regimes are nonreciprocal programs. However, developed countries take into account their own commercial interests in the design of the criteria for eligible countries. For instance, in the case of the US scheme of preferences such criteria include ensuring "equitable and reasonable" access in the beneficiaries' market to US products, protecting intellectual property rights, and preventing the seizure of property belonging to US citizens or businesses. In fact, following with the same example, the statutory goals of the US GSP include not only the development of developing countries by trade (rather than aid) as a more efficient way of promoting economic growth and development, but also the promotion of US exports in developing countries markets and trade liberalization in developing countries (Jones, 2006).

To the best of our knowledge, there are no studies that neither measure and compare the effect on the developing countries exports of all nonreciprocal preference regimes nor investigate the potential impact in the reverse direction. This paper fits within a larger literature that attempts to measure the effect of policies on bilateral trade

using gravity equations.<sup>1</sup> In particular, we estimate the effect of UPRs on exports with several estimation techniques including a recently developed econometric approach: the two-stage estimation procedure proposed by Helpman, Melitz and Rubinstein (2008). This technique allows to correct for selection bias and to account for exporter heterogeneity. The sample covers 177 countries over the period 1990-2008.

To preview our results, we find robust evidence that, on the whole, nonreciprocal preference regimes and, in particular, GSP schemes have had an economically significant effect on exports. The ACP-EU, EBA as well as GSP schemes of EU, US, Japan, Canada, Norway, Switzerland and Turkey show a positive effect on developing countries exports to the corresponding developed markets. However, we do not find evidence that membership in AGOA has had a positive effect on exports from African countries to the US. The same occurs for membership in the GSP schemes of Australia, New Zealand or Russia. Finally, we find that nonreciprocal preference regimes have also boosted exports from the donors (developed countries) to the beneficiaries (developing countries).

The paper is structured as follows. Section 2 provides a background of the GSP schemes and other nonreciprocal preference regimes. Section 3 presents the methodology. Section 4 describes the data. Section 5 discusses the estimation results. Finally, section 6 concludes the paper.

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<sup>1</sup> The main branch of that literature examines the effect of trade agreements (see, for example, Baier and Bergstrand, 2007; Baier, Bergstrand and Vidal, 2007; Carrère, 2006; Gil, Llorca and Martínez-Serrano, 2008a or Lee Park and Shin, 2008). But the gravity model has also been regularly used to estimate the trade effects of currency unions (Rose, 2000; Glick and Rose, 2002; Micco, Stein and Ordoñez, 2003), exchange rate regimes (Klein and Shambaugh, 2006 or Gil, Llorca and Martínez-Serrano, 2007) GATT/WTO membership (Rose, 2004; Subramanian and Wei, 2007 or Tomz, Goldstein and Rivers, 2007), and even of the physical presence of government officials in the destination markets or the existence of state visits (Rose, 2007; Nitsch, 2007; Gil, Llorca and Martínez-Serrano, 2008b or Volpe-Martincus and Carballo, 2008).

## **2. Background: Nonreciprocal preference regimes**

Since the early 1970s the EU, the US and other developed countries have provided developing countries with preferential market access via trade policies in the form of unilateral trade preference' programs, nonreciprocal agreements or preferential trade agreements. The Generalized System of Preferences (GSP) was the first one-way preferential regime implemented by developed countries in order to promote developing countries exports. The GSP is a system of individual national schemes based on common goals and principles. However, due to the existence of important differences in developed countries' economic structures and tariff programs there is not a unified system of tariff concessions. Each preference-granting country establishes particular criteria and conditions for defining and identifying developing countries beneficiaries.

The basic principle behind the GSP schemes is to provide a wide range of goods originating in developing countries with preferential market access (usually in the form of lower tariff rates or duty-free status) to developed country markets in order to spur on economic growth. The GSP were established on the basis that preferential tariff rates in developed country markets could promote export-driven industry growth in developing countries. The argument was that only the market size of industrialized trading partners were large enough to provide enough economic motivation to attain these goals. But the GSP were also established, in part, because lesser-developed countries called during the early negotiations on the General Agreement of Tariffs and Trade (GATT) for "special and differential treatment".

Since they were nonreciprocal and discriminatory preference programs, the GSP posed some problems under the GATT norms. They were inconsistent with the principle of reciprocity and, most importantly, with the principle placed on GATT Parties in

GATT Article I:1 to grant most-favoured-nation (MFN) tariff treatment to the products of all other GATT Parties. In 1965, GATT Parties made an amendment recognizing the special economic needs of developing countries and allowing for non-reciprocity. With respect to the issue of MFN, in 1971, GATT Parties adopted a waiver of Article I for GSP programs, which allowed developed contracting parties to accord more favourable tariff treatment to the products of developing countries for ten years. At the end of the Tokyo Round of Multilateral Trade Negotiations in 1979, developing countries secured adoption of the Enabling Clause, a permanent deviation from MFN by joint decision of the GATT Contracting Parties. The Enabling Clause was incorporated into the GATT 1994 upon the entry into force of the Uruguay Round agreements. In 1999, the WTO General Council adopted a decision which waived GATT Article I:1 until June 30, 2009.

As noted in the introductory material, EU and US trade policies towards developing countries go beyond their standard GSP schemes. In the case of the EU one of these additional nonreciprocal preference regimes is the ACP-EU Partnership Agreement. The notion of “ACP States” goes back to the “ACP Group of States”, formally established in 1975. From 1975 until 2000 the ACP-EU relations were governed by the regularly adapted and updated Lomé Conventions. The fourth Lomé Convention expired on 29 February, 2000, and it was succeeded by the Cotonou Agreement. The ACP Group of States counts 79 countries and most products originating in this group of countries are exempted from EU custom duties. Another preference regime, that forms part of the EU’s system of preferences, is the so-called Everything But Arms initiative, which provide duty-free and quota-free access to the EU market for all products (with the exception of arms and ammunition and some agricultural products) for the 49 Least Developed Countries. In terms of product coverage EBA is currently the most inclusive program.

The US administration also offers countries in the Caribbean and in Latin America special preferences under its Caribbean Basin Initiative (CBI) and Andean Trade Preference Act (ATPA), respectively. On the one hand, the CBI was initially launched in 1983, through the Caribbean Basin Economic Recovery Act (CBERA). In 2000, it was substantially expanded through the US-Caribbean Basin Trade Partnership Act (CBTPA). Currently, the CBI provides beneficiary countries with duty-free access to the US market for most goods. On the other hand, the ATPA was enacted in December 1991, to help four Andean countries (Bolivia, Colombia, Ecuador and Peru) in their fight against drug production and trafficking by expanding their economic alternatives. This initiative provides duty-free access to the US market for most of the products coming from these four countries, without requiring reciprocal liberalization in turn. The ATPA was renewed and amended in 2002 under a new denomination: the Andean Trade Promotion and Drug Eradication Act. The main change was the extension of the duty-free access to apparel and footwear.

Finally, the African Growth and Opportunity Act (AGOA) is the most recent one-way preferential arrangement of the US administration. Introduced in 2000, as part of the US “trade, not aid” economic philosophy towards Africa, AGOA has extended the product coverage of the US GSP scheme in the field of textiles and apparel products (in which beneficiary countries have the greatest comparative advantage) to around 40 countries of sub-Saharan Africa.

Before presenting the methodology, it is worth noting that there are large differences in the relative importance that developed countries markets represent in total exports from beneficiary countries. In 2008, both the EU and the US represent a quite relevant market share for the developing countries beneficiaries of the corresponding nonreciprocal preference regimes. In the cases of the GSP schemes of EU and US as

well as in the rest of nonreciprocal regimes granted for these countries (ACP-EU, EBA and AGOA) this market share ranges from 21 to 26%. It is even larger for the cases of ATPA (33%) and CBI (67%). For the remaining GSP schemes, market shares are lower: Japan (7 %), Australia (3%), Canada and Turkey (around 1.5%) and Switzerland, Russia, Norway and New Zealand less than 0.5%.

### 3. Methodology

The international trade literature provides two kinds of approaches to analysing the effects of preferential trade agreements (PTAs). The *ex-ante* approach, which uses computable general equilibrium (CGE) models, and the *ex post* approach, which measures trade effects by means of regression techniques. One advantage of CGE models is that they can be used to draw direct inferences about consumption, output and welfare. However, one major limitation of these models is that they use restrictive assumptions and very simple characterisations of real-world preferential trade agreements. In contrast, while the econometric studies cannot analyse consumption, output or welfare effects directly, they have three major advantages: implementation simplicity, superior empirical performance and the possibility of examining actual PTAs.

The gravity equation has emerged as the empirical workhorse in international trade for examining the *ex-post* effects of PTAs on bilateral trade flows. Therefore, to estimate the *ex post* effects of the special trade preferences given by developed countries to developing countries on international trade, we rely on the standard gravity model of trade, which relates bilateral trade flows to economic size, distance and other factors that affect trade barriers.<sup>2</sup>

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<sup>2</sup> The initial applications of the gravity equation to international trade lacked theoretical foundation. However, since the end of the 1970's the situation has changed and nowadays the gravity equation is



We estimate the following general equation:

$$\begin{aligned} \ln X_{ijt} = & \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ij} + \beta_4 Cont_{ij} + \beta_5 Island_{ij} \\ & + \beta_6 Landl_{ij} + \beta_7 Lang_{ij} + \beta_8 Colony_{ij} + \beta_9 ComCountry_{ij} \\ & + \beta_{10} Creligion_{ij} + \beta_{11} CU_{ijt} + \beta_{12} PTAPlur_{ijt} + \beta_{13} PTABil_{ijt} + \beta_{16} UPR_{ijt} + u_{ijt} \quad (1) \end{aligned}$$

where  $i$  and  $j$  denote trading partners,  $t$  is time, and the variables are defined as follows:

$X_{ijt}$  are the bilateral export flows from  $i$  to  $j$  in year  $t$ ,

$Y$  denotes Gross Domestic Product,

$D$  denotes the distance between  $i$  and  $j$ ,

$Cont$  is a dummy variable equal to one when  $i$  and  $j$  share a land border,

$Island$  is the number of island nations in the pair (0, 1, or 2),

$Landl$  is the number of landlocked areas in the country-pair (0, 1, or 2),

$Lang$  is a dummy variable which is unity if  $i$  and  $j$  have a common language,

$Colony$  is a binary variable which is unity if  $i$  ever colonized  $j$  or vice versa,

$ComCountry$  is a binary variable which is unity if  $i$  and  $j$  were part of a same country in the past,

$Creligion$  is an index of common religion<sup>3</sup>,

$CU$  is a binary variable which is unity if  $i$  and  $j$  use the same currency at time  $t$ ,

$PTAPlur$  ( $PTABil$ ) is a binary variable which is unity if  $i$  and  $j$  belong to the same plurilateral (bilateral) preferential trade agreement,

$UPR$  is a binary variable which is unity if  $i$  is a beneficiary of an Unilateral Preference Regime and  $j$  is the corresponding preference-giving country, and

$u_{ijt}$  is the standard classical error term.

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backed up by sound theory. See, among others, Anderson (1979), Bergstrand (1985 and 1989), Deardoff (1998), Evenett and Keller (2002), Eaton and Kortum (2002) and Anderson and van Wincoop (2003).

<sup>3</sup> The index is defined as: (% Protestants in country  $i$  \* % Protestants in country  $j$ ) + (% Catholics in country  $i$  \* % Catholics in country  $j$ ) + (% Muslims in Country  $i$  \* % Muslims in country  $j$ ).

We estimate the gravity equation (1) in a number of different ways. We begin with conventional ordinary least squares, including a full set of year-specific intercepts and using robust standard errors. Next we run the gravity equation using both country fixed effects (CFE) and country year fixed effects (CYFE). The strategy of using CFE sufficiently addresses multilateral resistance in a cross section but CYFE are required to comprehensively control for multilateral resistance in panel datasets (Anderson and van Wincoop, 2003 and 2004). We additionally employ an additional and recently developed econometric approach: the two-stage estimation procedure proposed by HMR (2008), which allows us to correct for selection bias and to account for exporter heterogeneity. This procedure is briefly outlined next.

The HMR (2008) estimation procedure consists in two-stages. In the first stage they estimate a probit equation that specifies the probability that country  $i$  exports to  $j$  conditional on the observable variables. In the second stage, predicted components of this equation are used to estimate the gravity equation. This procedure simultaneously corrects for two types of potential biases: a Heckman selection bias and a bias from potential asymmetries in the trade flows between pairs of countries.

More formally, in a first stage they estimate a probit equation of the type:

$$\text{Pr ob}(T_{ij} = 1 / \text{observed variables}) = \Phi(\chi_i, \lambda_j, X_{ij}, Z_{ij}, \varepsilon_{ij}) \quad (2)$$

where  $T_{ij}$  is an indicator variable equal to 1 when country  $i$  exports to  $j$  and zero when it does not,  $\Phi$  is the cumulative distribution function of the standard normal distribution,  $\chi_i$  and  $\lambda_j$  are exporter and importer fixed effects,  $X_{ij}$  are variables which affect both the probability and the volume of trade, and  $Z_{ij}$  represents variables that are used for the exclusion restriction, that is, those that affect the probability of observing a

positive volume of trade but do not impact the volume of trade if this were to be positive.<sup>4</sup> Using the probit regression, they construct two variables that are included as regressors in the second stage estimation. One is the inverse of Mills ratio and the other is an expression that controls for firm size heterogeneity. In particular, the second stage consists in the estimation for a given year of the following non-linear equation for all country-pairs with positive trade flows:

$$\ln trade_{ij} = \beta_0 + \lambda_j + \chi_i - \gamma X_{ij} + \theta \hat{\eta}_{ij}^* + \ln \left\{ \exp \left[ \delta (\hat{z}_{ij}^* + \hat{\eta}_{ij}^*) \right] - 1 \right\} + \varepsilon_{ij} \quad (3)$$

where  $\hat{\eta}_{ij}^*$  is the inverse Mills ratio and  $\hat{z}_{ij}^* = \Phi^{-1}(\hat{\rho}_{ij})$  in which  $\hat{\rho}_{ij}$  are the estimates from the probit equation.<sup>5</sup>

#### 4. Data

The trade data for the regressand (export flows from country  $i$  to country  $j$ ) come from the “Direction of Trade” (DoT) dataset built up by the International Monetary Fund (IMF). The data comprise bilateral merchandise trade between 177 countries and territories (see Appendix) for seven years of the period 1990-2008 at three-year intervals (1990, 1993, 1996, 1999, 2002, 2005 and 2008).<sup>6</sup> The DoT dataset provides FOB exports in US dollars. These series are converted into constant terms using the American GDP deflator taken from the Bureau of Economic Analysis (US Department of Commerce).

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<sup>4</sup> In this set-up, parameter identification requires the existence of a variable that affects the probability of observing a non-zero flow between two countries but not the volume. Alternatively, a variable which affects both decisions in opposite directions would also work.

<sup>5</sup> Since equation (3) is non-linear in  $\delta$ , following HMR (2008) we estimate it using maximum likelihood.

<sup>6</sup> It is noteworthy that not all the areas considered are countries in the conventional sense of the word. We also include some dependencies, territories and overseas departments in the data.

The independent variables come from different sources. GDP data in constant US dollars are taken from the World Development Indicators (World Bank). For location of countries (geographical coordinates), used to calculate Great Circle Distances, and the construction of the dummy variables for physically contiguous neighbours, island and landlocked status, common language, colonial ties, common religion and common country background data are taken from the CIA's World Factbook. The indicators of preferential trade agreements have been built using data from the World Trade Organization, the Preferential Trade Agreements Database (The Faculty of Law at McGill University) and the web site [http://ec.europa.eu/trade/issues/bilateral/index\\_en.htm](http://ec.europa.eu/trade/issues/bilateral/index_en.htm). The indicators of currency unions are taken from Reinhart and Rogoff (2002), CIA's World Factbook and Masson and Pattillo (2005). The sample includes 192 preferential trade agreements (plurilateral and bilateral) and 17 currency unions.<sup>7</sup> Data on the key variables AGOA and EBA come from the corresponding web pages<sup>8</sup>. The list of beneficiaries of the Cotonou Agreement comes from <http://ec.europa.eu/trade/wider-agenda/development/economic-partnerships>. The list of countries beneficiaries of the standard GSP schemes are taken from the United Nations Conference on Trade and Development (2008). The list of Caribbean Basin Initiative (CBI) and Andean Trade Preference Act (ATPA) come from the Office of United States Trade Representative.

## **5. Empirical results**

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<sup>7</sup> The expression PTAs in this paper refers also to other agreements involving a higher degree of economic integration. In fact, most economic integration agreements considered in the sample are free trade agreements.

<sup>8</sup> See, [http://www.agoa.gov/eligibility/country\\_eligibility.html](http://www.agoa.gov/eligibility/country_eligibility.html) for AGOA and <http://ec.europa.eu/trade/wider-agenda/development/generalised-system-of-preferences/everything-but-arms>, for EBA.

Our benchmark specification to estimate the effect of unilateral preference regimes on developing countries exports is Ordinary Least Squares (with a full set of year-specific intercepts added to correct for common shocks and trends). The results are reported in column 1 of Table 1. The gravity equation works well in two senses. First, the equation fits the data well explaining around two-thirds of the variation of bilateral exports flows. Second, the estimated coefficients are, on the whole, intuitive in sign and size and both economically and statistically significant. The negative effect of a common religion is the exception. Economically larger countries trade more and more distant countries trade less. Landlocked countries trade less, whereas sharing a common border, a common language, a common currency, or sharing membership in a plurilateral or bilateral preferential trade agreements increase trade. The existence of colonial ties encourages trade, as do being islands or part of the same country in the past. With regard to the variable of interest (*UPR*), we find an estimated coefficient that is positive but statistically insignificant at conventional levels.

Columns 2 and 3 of Table 1 contains regression results adding country-specific fixed effects (CFE) and country year fixed effects (CYFE) to the benchmark equation, respectively. The inclusion of CFE (column 2) controls for the multilateral resistance terms under the assumption that these terms do not vary over time. In almost all cases, the impact goes in the same direction than in column 1. The exceptions are the estimated coefficients of the variables for common religion (that in this case is positive and statistically significant at the 1 percent level) and currency union (that loses the statistical significance). The estimated coefficient of the variable *UPR* also differs from that found without controls for multilateral resistance terms. With the inclusion of CFE the estimated coefficient is positive (0.200) and highly statistically significant. Results including time-varying fixed effects for exporters and importers (CYFE) reinforces this

finding (column 3). When we properly account for the fact that multilateral resistance may change over time, the variable of interest presents an estimated coefficient that raises its value from 0.200 to 0.347. Thus, we find that unilateral preference regimes are associated with an increase of exports from developing countries benefiting from these nonreciprocal preference schemes.

Columns 1 to 3 report the results for three specifications that include a catch-all *UPR* dummy. Eicher and Henn (2009), in a recent paper on a related strand of the empirical gravity literature (the measurement of the effect of currency unions on trade), show the importance of splitting the catch-all PTA and CU dummies into the individual PTAs and CU arrangements. According to these authors, if individual PTAs and CUs do not generate identical trade benefits, as a large empirical literature has documented, estimating an average coefficient using catch-all PTA or CU dummies generates biased results. In line with this argument, it is important to estimate the gravity equation allowing for individual UPR effects.<sup>9</sup>

The next step of the estimation process is to run the gravity equation splitting the *UPR* dummy into a catch-all *GSP* dummy and separate dummies for *AGOA*, *CBI*, *ATPA*, *EBA* and *ACP-EU*. Columns 4 to 6 present the results using OLS, CFE and CYFE, respectively. We focus in the latter approach since it comprehensively accounts for multilateral resistance and, therefore, it is the only fully in line with the theoretical foundations of the gravity equation. We find that *CBI*, *ATPA*, *ACP-EU* and *EBA* increase exports from the developing world, as do *GSP* schemes. The results for *GSP* are consistent with Subramanian and Wei (2007), who find that the *GSP* extended from

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<sup>9</sup> Since *AGOA* members are also *GSP* beneficiaries of US, before *AGOA* got into force the dummy variable *GSPUS* takes the value of 1 for all countries under the US's *GSP* scheme and after that date only for non-*AGOA* countries under the US's *GSP* scheme. The same criteria are followed for the *GSPEU* dummy with respect to the dummies *ACP-EU* and *EBA*.

the North to developing countries boosts trade.<sup>10</sup> However, we do not find evidence that membership in the AGOA has had a positive effect on African exports to US.<sup>11</sup>

Table 2 repeats the estimations with higher levels of disaggregation of the variables of interest. The first three columns present the results when we split the *GSP* dummy into three dummies: *GSPEU* (for the EU), *GSPUS* (for the US) and one separate dummy variable to capture all “other” GSP schemes (*OtherGSP*). The estimated coefficients for GSP schemes of EU and US are both positive and statistically significant, once we control for time-varying multilateral resistance terms. In particular, the estimated coefficients for *GSPUS* and *GSPEU* are 0.830 and 0.552, respectively (and they are statistically significant at the 1 percent level). However, the estimated coefficient of the variable that captures the impact of all other GSP schemes altogether is lower (0.085) and non-statistically significant at conventional levels. According to these results, the positive effect of being in the standard EU’s GSP scheme is larger than that of being in ACP-EU agreement and that of being in EBA.<sup>12</sup> However, in contrast

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<sup>10</sup> There are few studies that have attempted to estimate the overall effect of the GSP. Rose (2004) and Tomz, Goldstein and Rivers (2007) find a positive effect but treat the average of two-way bilateral trade as the dependent variable. Subramanian and Wei (2007) criticize Rose for averaging imports and exports, though GSP effects should differ according to whether the importer or the exporter was the recipient of the preferences. These authors, using unidirectional trade data, show an estimated effect for the GSP very similar to that reported by Rose (2004). In contrast, Goldstein, Rivers and Tomz (2007), using also a data set comprised of directed dyads, find a negative coefficient for GSP.

<sup>11</sup> Some papers provide arguments for the ineffectiveness of AGOA. For instance, Matoo, Roy and Subramanian (2002) outline the relevance of rules of origin as a factor that could limit the achievement of high benefits. Nouve (2005) asserts that, while the AGOA apparel preferences may increase African textile and apparel exports to US, resource allocation probably would induce the reduction of overall exports. Finally, Brenton and Hoppe (2006) argue that the impact of AGOA would be enhanced if preferences were extended to all products. Additionally, these authors point out that for the majority of beneficiaries the value of preferences is very small.

<sup>12</sup> Nilsson (2002), in a comparative analysis of the effects of the EU’s Lomé Convention and GSP on exports of developing countries, finds positive and statistically significant export effects of both, but concludes that the export impact of the Lomé Convention were greater over the period 1973-1992.

with the estimates for the impact of the US's GSP scheme, as well as the CBI and ATPA initiatives, but in line with our previous estimates, countries belonging to AGOA do not export more to the US.

Next, we re-estimate the gravity equation including a separate dummy for each individual UPR (columns 4 to 6). It allows us to check that there is a large heterogeneity in the impact of the different GSP schemes. According to the results reported in column 6 (CYFE), the largest estimated coefficients are found for *GSPUS* (0.831) and *GSPJapan* (0.791), followed by *GSPEU* (0.559). However, our results suggest that remaining GSP schemes are not associated with an increase in exports. In fact, surprisingly, the dummy variables for Australia, New Zealand's and Russia's GSP schemes show a negative and statistically significant coefficient.

Column 6 of Table 2 reports the results for a specification that include catch-all PTA or CU dummies. Following Eicher and Henn (2009), we also report the results allowing for individual plurilateral PTAs and individual CUs effects (column 7). The estimated coefficients of these variables and the fixed effects are not reported in the table for ease of presentation.<sup>13</sup> As we can observe, the estimated coefficients do not change in a significant way and, in particular, the estimated coefficients of the variables of interest remain nearly unaltered with two exceptions: *GSPNorway* and *GSPSwitzerland* (that are positive and now reach the statistical significance at least at the 10 percent level).

The problem of all the above estimations is that in those regressions we use the sample of countries with positive trade volumes between them. Disregarding countries that do not trade with each other may produce biased estimates (HMR, 2008). Therefore,

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<sup>13</sup> Our sample includes more than 200 individual bilateral and plurilateral PTAs and CUs. For bilateral PTAs we have estimated an average coefficient using a catch-all dummy. The inclusion of individual dummies for bilateral PTAs does not affect the results in any significant way.



now we turn to the analysis of the results using the two stages estimation procedure suggested by HMR (2008). Table 3 reports the results. Since our sample has time dimension we include in this framework country year fixed effects in order to capture the time-varying nature of trade costs in panel data.<sup>14</sup> The results for the probit regression are presented in column 1.<sup>15</sup> Before discussing the empirical results, it is worth noting that the estimation of equation (2) might be subject to the incidental parameter problem, introducing a bias in the coefficients of the rest of variables ( $X_{ij}$  and  $Z_{ij}$ ). However, as pointed out by Fernández-Val (2007), this bias does not affect the estimated marginal effects and, therefore, the predicted values obtained for the dependent variable. These results compared with those found using CYFE in Table 2 clearly show that almost the same control variables that impact export volumes in the traditional estimation with CYFE also impact the probability that country  $i$  exports to country  $j$ . The exception is the dummy variable  $CU$ , which positively affects the probability of exports but do not affect the volume of exports (in any of the previous specifications).<sup>16</sup> With regard to the dummies for nonreciprocal preference regimes, the estimated marginal effect of the variables of interest are once again positive and statistically significant for  $EBA$ ,  $ACP-EU$  and  $GSP$  schemes of EU and US, but in contrast to CYFE, this is also the case for  $GSP$  schemes of Canada, Japan, Norway,

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<sup>14</sup> HMR (2008) applies their two stages estimation procedure to data from 1986 including in the regression exporting and importing CFE. The working paper version of this article (HMR, 2007) also presented the results for a large sample that covered all the 1980s. However, they also used in these regressions CFE and year fixed effects instead of CYFE.

<sup>15</sup> Following HMR (2008) we also have country pairs whose characteristics are such that their probability of trade is indistinguishable from 1. Therefore, we assign the same  $\hat{z}_{ij}^*$  to those country pairs with an estimated  $\hat{\rho}_{ij} > 0.9999999$ .

<sup>16</sup> The result for the variable  $CU$  (currency unions) contrast with the large evidence emerged after the Rose (2000) seminal paper. See Gil, Llorca and Martínez-Serrano (2008c) for a review of the literature about the  $CU$  trade effects.

Russia and Switzerland, suggesting that being members of these initiatives raises the probability of bilateral trade from developing countries to the cited developed countries.

Using the probit regression, as explained before, we construct two variables for correcting sample selection bias and firm heterogeneity. Both the non-linear coefficient  $\delta$  and the linear coefficient for  $\hat{\eta}_{ij}^*$  are precisely estimated. The results for the second stage can be seen in column 2 of Table 3. The variable *CU* has been excluded from the estimation for identification reasons.<sup>17</sup> The estimated coefficients are in line with those found using OLS including *CYFE*. At this stage, we once again find a positive and significant coefficient for *EBA*, *ACP-EU*, *GSPUS* and *GSPEU*. This is also the case for *GSPCanada*, *GSPJapan*, *GSPNorway*, *GSPSwitzerland* and *GSPTurkey*, but not for *AGOA*, *CBI*, *ATPA* and the remaining GSP schemes. In particular, the largest estimated coefficients are found for *GSPJapan* (0.811) and *GSPUS* (0.766), which suggests that, other things equal, developing countries benefiting from trade preferences under the Japan and United States GSP schemes export more than twice to these markets. Once again, the estimated coefficients for *GSPAustralia*, *GSPNZ* and *GSPRussia* are negative and statistically significant.

Finally, it is important to analyze whether or not unilateral preference regimes have also had an effect on exports from the preference-granting countries to the beneficiary countries. In order to study the potential effect of unilateral preference regimes on exports from developed countries to developing countries, we have augmented the gravity equation (1) by adding a binary dummy variable (*MUPR*) which is unity if *i* is a benefactor country of an unilateral preference regime and *j* is the corresponding beneficiary country. The results from a theoretically motivated

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<sup>17</sup> Following HMR (2007, footnote 26), we have also used the variable common religion for this purpose. It yields very similar results (available from the authors upon request).

specification of the gravity equation (using CYFE) appear in column 1 of Table 4. The estimated coefficients change very little with respect to those reported in column 3 of Table 1. In particular, the evidence about the positive impact of unilateral preference regimes on exports from developing countries to industrialized nations remains unaltered and the estimated coefficient of this variable is very similar to that offered in Table 1. The novelty is that we also find a positive (0.451) and statistically significant coefficient (at the 1 percent level) for the variable that captures the effect on exports from developed countries to developing countries (*MUPR*). It suggests that these preferential regimes have had economic success in terms of trade in both directions.

Columns 2 to 3 of Table 4 present the results for different levels of disaggregation of the UPRs dummies (using again CYFE in all the cases). Similar to the column 1 results, the coefficient estimates of the variables of interest in columns 2 to 4 of Table 4 lead to conclude that there is evidence of a positive effect on benefactor exports to developing countries. In most of the cases the unilateral programs have stimulated trade in both directions. However, and in line with our previous estimates, AGOA is an exception. It has not increased exports in any direction.

## **6. Conclusions**

This paper investigates whether and to what extent unidirectional trade agreements have increased developing countries' exports to richer countries. Moreover, it also analyses the potential impact in the reverse direction. Using traditional estimation techniques and recent developments in the econometric analysis of the gravity equation over the period 1990-2008, we find robust evidence that, on the whole, nonreciprocal preference regimes and GSP schemes have had an economically significant effect on exports. However, the estimation of catch-all dummies masks heterogeneous results for the individual schemes. In particular, we find strong evidence that the ACP-EU and

GSP schemes of US and EU have had a large positive effect on developing countries exports to the corresponding developed markets (US or EU). This result also applies to EBA membership and to the GSP schemes of Canada, Japan, Norway, Switzerland and Turkey once we control for time-varying multilateral resistance terms, sample selection bias and unobservable firm heterogeneity. However, we do not find evidence that membership in the AGOA scheme has had a positive effect on exports from African countries to US and the same applies for the remaining GSP schemes.

Most economists prefer two-way tariff cuts because when tariffs are reduced in a reciprocal manner rather than in an unilateral way, countries tend to produce and export on the basis of their comparative advantage (thus exporting products that they produce relatively better and importing products that others do relatively more efficiently). Despite the “lack of reciprocity”, we find that unilateral preference regimes have also had a positive effect on exports from donor countries to developing counterparts. It suggests that, in contrast with the argument raised by critics of nonreciprocal programs, unilateral preference regimes have not had a perverse effect on trade policies of beneficiary countries (in particular with respect to the preference-granting countries).

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### **References**

- Anderson, J.E., 1979. A. Theoretical foundation to the gravity equation. *American Economic Review* 69, 106-116.
- Anderson, J.E., van Wincoop, E., 2003. Gravity with gravitas: A solution to the border puzzle. *American Economic Review* 93, 170-192.
- Anderson, J.E., van Wincoop, E., 2004. Trade Costs. *Journal of Economic Literature* 42, 691-741.
- Baier, S.L., Bergstrand, J.H., 2007. Do free trade agreements actually increase members' international trade? *Journal of International Economics* 71, 72-95.
- Baier, S.L., Bergstrand, J.H., Vidal, E., 2007. Free trade agreements in the Americas: Are the trade effects larger than anticipated? *The World Economy* 30, 1347-1377.
- Bergstrand, J.H., 1985. The gravity equation in international trade: some microeconomic foundations and empirical evidence. *Review of Economics and Statistics* 67, 474-481.
- Bergstrand, J.H., 1989. The generalised gravity equation, monopolistic competition, and the factor proportions theory in international trade. *Review of Economics and Statistics* 71, 143-53.
- Brenton, P., Hoppe, M. 2006. The African Growth and Opportunity Act, Exports, and Development in Sub-Saharan Africa. World Bank Policy Research Working Paper 3996.
- Carrère, C., 2006. Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. *European Economic Review*, 50, 223-227.
- Deardoff, A.V., 1998. Determinants of bilateral trade: does gravity work in a neoclassic world? In: Frankel, J. (Ed.) *The Regionalization of the World Economy*, University of Chicago Press, Chicago.
- Eaton, J., S. Kortum, S., 2002. Technology, Geography and Trade. *Econometrica*, **70**, 5, 1741-79.
- Eicher, T.S., Henn, Ch., 2009. One money, one market – A revisited benchmark. *International Monetary Fund Working Paper* 186.
- Evenett, S.J., Keller, W., 2002. On theories explaining the success of the gravity equation. *Journal of Political Economy* 110, 281-316.

- Fernández-Val., I., 2007. Fixed effects estimation of structural parameters and marginal effects in panel probit models. Department of Economics: Boston University.
- Gil-Pareja, S., Llorca-Vivero, R., Martínez-Serrano, J.A. 2007. Did the European exchange-rate mechanism contribute to the integration of peripheral countries? *Economics Letters* 95, 303-308.
- Gil-Pareja, S., Llorca-Vivero, R., Martínez-Serrano, J.A. 2008a. Assessing the enlargement and deepening of the European Union. *The World Economy* 31, 1253-1272.
- Gil-Pareja, S., Llorca-Vivero, R., Martínez-Serrano, J.A. 2008b. Measuring the impact of regional export promotion: The Spanish case. *Papers in Regional Science* 87, 139-146.
- Gil-Pareja, S., Llorca-Vivero, R., Martínez-Serrano, J.A. 2008c. Trade effects of monetary agreements: Evidence for OECD countries. *European Economic Review* 52, 733-755.
- Glick, R., Rose, A. K., 2002. Does a currency union affect trade? The time-series evidence. *European Economic Review* 46, 1125-1151.
- Goldstein, J. L., Rivers, D., Tomz, M., 2007. Institutions in international relations: Understanding the effects of the GATT and the WTO on world trade. *International Organization* 61, 37-67.
- Helpman, E., Melitz, M., Rubinstein, Y., 2008. Estimating trade flows: trade partners and trade volumes. *Quarterly Journal of Economics* 123, 441-487.
- Klein, M.W., Shambaugh, J. C., 2006. Fixed exchange rates and trade. *Journal of International Economics* 70, 359-383.
- Jones, V. C., 2006. Generalized System of Preferences: Background and Renewal Debate. Congressional Research Service Report for Congress. The Library of Congress.
- Lee, J. W., Park, I., Shin, K. 2008. Proliferating regional trade arrangements: Why and whither? *The World Economy*, 31, 1525-1557.
- Masson, P.R., Patillo, C., 2005. *The Monetary Geography of Africa*. Brookings Institution Press, Washington, D. C.
- Matoo, A., Roy, D., Subramanian, A., 2002. The African Growth and Opportunity Act and Its Rules of Origin: Generosity Undermined? World Bank Policy Research Working Paper 2908.

- Micco, A., Stein, E., Ordoñez, G., 2003. The currency union effect on trade: Early evidence from EMU. *Economic Policy* 18, 315-356.
- Nilsson, L., 2002. Trading relations: Is the road map from Lomé to Cotonou correct? *Applied Economics* 34, 439-452.
- Nitsch, V., 2007. State visits and international trade. *The World Economy* 30, 1797-1816.
- Nouve, K., 2005. Estimating the Effects of AGOA on African Exports Using a Dynamic Panel Analysis. Available at SSRN: <http://ssrn.com/abstract=1026204>.
- Reinhart, C.M., Rogoff, K.S., 2002. The modern history of exchange rates arrangements: a reinterpretation. NBER Working Paper 8963.
- Rose, A. K., 2000. One money, one market: The effect of common currencies on trade. *Economic Policy* 30, 7-46.
- Rose, A., 2004. Do we really know that the WTO increases trade? *American Economic Review* 94, 98-114.
- Rose, A., 2007. The Foreign service and foreign trade: Embassies as export promotion. *The World Economy* 30, 22-38.
- Subramanian, A., Wei, S-W., 2007. The WTO promotes trade, strongly but unevenly. *Journal of International Economics* 72, 151-175.
- Tinbergen, J., 1962. *Shaping the world economy*. New York, NY: The Twentieth Century Fund.
- Tomz, M., Goldstein, J. L., Rivers, D. 2007. Do we really know that the WTO increases trade? Comment. *American Economic Review* 97, 2005-2018
- United Nations Conference on Trade and Development, 2008. *Generalized System of preferences, List of Beneficiaries*. United Nations, New York and Geneva, 2008.
- Volpe-Martincus, Ch., Carballo, J., 2008. Is export promotion effective in developing countries? Firm-level evidence on the intensive and extensive margins of exports. *Journal of International Economics* 76, 89-106.

Table 1. OLS and fixed effects estimations of the gravity equation (1). Sample period 1990, 1993, 1996, 1999, 2002, 2005, 2008.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	CFE	CYFE	OLS	CFE	CYFE
LnY <sub>it</sub>	1.036 (0.006) <sup>***</sup>	0.949 (0.053) <sup>***</sup>		1.037 (0.006) <sup>***</sup>	0.962 (0.053) <sup>***</sup>	
LnY <sub>jt</sub>	0.815 (0.006) <sup>***</sup>	0.733 (0.044) <sup>***</sup>		0.814 (0.006) <sup>***</sup>	0.713 (0.044) <sup>***</sup>	
Ln D <sub>ij</sub>	-1.044 (0.018) <sup>***</sup>	-1.347 (0.019) <sup>***</sup>	-1.221 (0.020) <sup>***</sup>	-1.046 (0.018) <sup>***</sup>	-1.349 (0.019) <sup>***</sup>	-1.216 (0.020) <sup>***</sup>
Cont <sub>ij</sub>	0.812 (0.080) <sup>***</sup>	0.559 (0.081) <sup>***</sup>	0.645 (0.075) <sup>***</sup>	0.815 (0.080) <sup>***</sup>	0.555 (0.082) <sup>***</sup>	0.652 (0.075) <sup>***</sup>
Lang <sub>ij</sub>	0.626 (0.038) <sup>***</sup>	0.583 (0.037) <sup>***</sup>	0.370 (0.036) <sup>***</sup>	0.622 (0.038) <sup>***</sup>	0.588 (0.037) <sup>***</sup>	0.368 (0.037) <sup>***</sup>
Colony <sub>ij</sub>	0.870 (0.089) <sup>***</sup>	0.924 (0.086) <sup>***</sup>	1.299 (0.084) <sup>***</sup>	0.869 (0.089) <sup>***</sup>	0.917 (0.086) <sup>***</sup>	1.312 (0.085) <sup>***</sup>
ComCount <sub>ij</sub>	2.508 (0.096) <sup>***</sup>	2.669 (0.111) <sup>***</sup>	2.651 (0.116) <sup>***</sup>	2.504 (0.096) <sup>***</sup>	2.668 (0.111) <sup>***</sup>	2.670 (0.116) <sup>***</sup>
Island <sub>ij</sub>	0.790 (0.084) <sup>***</sup>	0.800 (0.076) <sup>***</sup>	0.454 (0.071) <sup>***</sup>	0.792 (0.083) <sup>***</sup>	0.809 (0.076) <sup>***</sup>	0.453 (0.071) <sup>***</sup>
Landl <sub>ij</sub>	-0.467 (0.026) <sup>***</sup>	-0.701 (0.068) <sup>***</sup>	-0.842 (0.052) <sup>***</sup>	-0.461 (0.027) <sup>***</sup>	-0.703 (0.068) <sup>***</sup>	-0.840 (0.052) <sup>***</sup>
CReligion <sub>ij</sub>	-0.194 (0.049) <sup>***</sup>	0.409 (0.047) <sup>***</sup>	0.385 (0.048) <sup>***</sup>	-0.205 (0.049) <sup>***</sup>	0.400 (0.047) <sup>***</sup>	0.391 (0.048) <sup>***</sup>
CU <sub>ijt</sub>	0.326 (0.113) <sup>***</sup>	0.080 (0.112) <sup>***</sup>	-0.125 (0.111) <sup>***</sup>	0.312 (0.113) <sup>***</sup>	0.079 (0.112) <sup>***</sup>	-0.146 (0.111) <sup>***</sup>
RTAPLur <sub>ijt</sub>	0.947 (0.051) <sup>***</sup>	0.628 (0.047) <sup>***</sup>	0.845 (0.050) <sup>***</sup>	0.949 (0.051) <sup>***</sup>	0.627 (0.047) <sup>***</sup>	0.839 (0.050) <sup>***</sup>
RTABil <sub>ijt</sub>	0.317 (0.025) <sup>***</sup>	0.215 (0.020) <sup>***</sup>	0.434 (0.045) <sup>***</sup>	0.309 (0.025) <sup>***</sup>	0.209 (0.020) <sup>***</sup>	0.433 (0.045) <sup>***</sup>
UPR <sub>ijt</sub>	0.045 (0.040)	0.200 (0.043) <sup>***</sup>	0.347 (0.049) <sup>***</sup>			
GSP <sub>ij</sub>				0.023 (0.044)	0.185 (0.046) <sup>***</sup>	0.387 (0.053) <sup>***</sup>
AGOA <sub>ijt</sub>				0.204 (0.331)	-0.266 (0.306)	-0.223 (0.335)
CBI				0.702 (0.224) <sup>***</sup>	0.183 (0.313)	0.651 (0.326) <sup>**</sup>
ATPA				1.766 (0.214) <sup>***</sup>	1.009 (0.230) <sup>***</sup>	1.150 (0.238) <sup>***</sup>
EBA <sub>ijt</sub>				-0.304 (0.085) <sup>***</sup>	-0.031 (0.079)	0.217 (0.093) <sup>**</sup>
ACP-EU <sub>ij</sub>				0.258 (0.074) <sup>***</sup>	0.352 (0.071) <sup>***</sup>	0.183 (0.074) <sup>***</sup>
Time dummies	Yes	Yes	No	Yes	Yes	No
No observat.	97,730	97,730	106,870	97,730	97,730	106,870
Adj-R <sup>2</sup>	0.66	0.74	0.67	0.66	0.74	0.67

Notes: Regressand: log of real bilateral exports. Robust standard errors (clustered by country-pairs) are in parentheses.\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.



Table 2. OLS and fixed effects estimations of the gravity equation (1). Sample period 1990, 1993, 1996, 1999, 2002, 2005, 2008.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	CFE	CYFE	OLS	CFE	CYFE	CYFE
LnY <sub>it</sub>	1.037 (0.006)***	0.959 (0.053)***		1.037 (0.006)***	0.960 (0.053)***		
LnY <sub>jt</sub>	0.812 (0.006)***	0.713 (0.044)***		0.812 (0.006)***	0.713 (0.044)***		
Ln D <sub>ij</sub>	-1.046 (0.018)***	-1.352 (0.019)***	-1.219 (0.020)***	-1.045 (0.018)***	-1.358 (0.019)***	-1.224 (0.020)***	-1.210 (0.021)***
Cont <sub>ij</sub>	0.817 (0.080)***	0.547 (0.082)***	0.643 (0.076)***	0.821 (0.080)***	0.532 (0.081)***	0.627 (0.075)***	0.689 (0.078)***
Lang <sub>ij</sub>	0.620 (0.038)***	0.586 (0.037)***	0.366 (0.037)***	0.618 (0.038)***	0.585 (0.037)***	0.367 (0.037)***	0.326 (0.038)***
Colony <sub>ij</sub>	0.862 (0.089)***	0.913 (0.086)***	1.300 (0.085)***	0.862 (0.089)***	0.916 (0.086)***	1.304 (0.085)***	1.327 (0.086)***
ComCount <sub>ij</sub>	2.500 (0.096)***	2.662 (0.110)***	2.663 (0.116)***	2.506 (0.096)***	2.620 (0.111)***	2.612 (0.116)***	2.696 (0.143)***
Island <sub>ij</sub>	0.805 (0.083)***	0.804 (0.075)***	0.454 (0.071)***	0.813 (0.084)***	0.807 (0.075)***	0.457 (0.071)***	0.420 (0.073)***
Landl <sub>ij</sub>	-0.460 (0.027)***	-0.705 (0.068)***	-0.836 (0.052)***	-0.472 (0.027)***	-0.701 (0.068)***	-0.840 (0.052)***	-0.829 (0.052)***
CReligion <sub>ij</sub>	-0.210 (0.049)***	0.404 (0.047)***	0.395 (0.048)***	-0.212 (0.049)***	0.401 (0.047)***	0.392 (0.048)***	0.380 (0.049)***
CU <sub>ijt</sub>	0.311 (0.113)***	0.095 (0.111)	-0.125 (0.110)	0.315 (0.113)***	-0.092 (0.111)	-0.117 (0.110)	
RTAPlur <sub>ijt</sub>	0.948 (0.051)***	0.632 (0.048)***	0.850 (0.051)***	0.950 (0.051)***	0.640 (0.048)***	0.850 (0.051)***	
RTABil <sub>ijt</sub>	0.296 (0.025)***	0.196 (0.020)***	0.401 (0.045)***	0.296 (0.025)***	0.197 (0.020)***	0.405 (0.045)***	0.492 (0.046)***
AGOA <sub>ijt</sub>	0.195 (0.332)	-0.287 (0.344)	-0.051 (0.366)	0.193 (0.332)	-0.286 (0.344)	-0.054 (0.366)	-0.060 (0.367)
CBI	0.258 (0.256)	0.181 (0.314)	0.575 (0.348)*	0.257 (0.256)	0.183 (0.314)	0.577 (0.347)*	0.614 (0.359)*
ATPA	1.035 (0.263)***	1.028 (0.259)***	0.916 (0.286)***	1.036 (0.263)***	1.026 (0.259)***	0.911 (0.286)***	0.902 (0.294)***
EBA <sub>ijt</sub>	-0.299 (0.085)***	0.017 (0.079)	0.299 (0.094)***	-0.299 (0.085)***	0.021 (0.079)	0.295 (0.094)***	0.358 (0.098)***
ACP-EU <sub>ij</sub>	0.267 (0.074)***	0.405 (0.071)***	0.251 (0.075)***	0.265 (0.074)***	0.414 (0.071)***	0.257 (0.075)***	0.324 (0.077)***
GSPEU <sub>ij</sub>	0.082 (0.053)	0.306 (0.052)***	0.552 (0.063)***	0.081 (0.053)	0.314 (0.052)***	0.559 (0.063)***	0.655 (0.067)***
GSPUS <sub>ij</sub>	0.762 (0.165)***	0.147 (0.0197)	0.830 (0.230)***	0.759 (0.165)***	0.147 (0.198)***	0.831 (0.231)***	0.851 (0.233)***
OtherGSP <sub>ij</sub>	-0.124 (0.070)*	-0.015 (0.0084)	0.085 (0.085)				
GSPAustralia <sub>ij</sub>				-0.531 (0.337)	-0.572 (0.291)**	-0.665 (0.287)**	-0.801 (0.302)***
GSPCanada <sub>ij</sub>				-0.177 (0.144)	-0.017 (0.177)	0.280 (0.199)	0.274 (0.200)
GSPJapan <sub>ij</sub>				-0.209 (0.170)	0.307 (0.222)	0.791 (0.241)***	0.768 (0.242)***
GSPNZ <sub>ij</sub>				-0.113 (0.211)	-0.515 (0.236)**	-0.531 (0.230)**	-0.513 (0.230)**
GSPNorway <sub>ij</sub>				-0.500 (0.232)*	0.550 (0.239)**	0.321 (0.237)	0.434 (0.239)*
GSPRussia <sub>ij</sub>				-0.091 (0.203)	-0.728 (0.270)***	-0.894 (0.280)***	-0.912 (0.281)***
GSPSwitzerland <sub>ij</sub>				0.300 (0.150)**	0.402 (0.225)*	0.259 (0.193)	0.400 (0.202)**
GSPTurkey <sub>ij</sub>				-0.131 (0.161)	0.099 (0.183)	0.280 (0.208)	0.280 (0.208)
Time dummies	Yes	Yes	Yes	Yes	Yes	No	No
No observat.	97,730	97,730	106,870	97,730	97,730	106,870	106,870
Adj-R <sup>2</sup>	0.66	0.74	0.67	0.66	0.74	0.67	0.67

Notes: Regressand: log of real bilateral exports. Robust standard errors (clustered by country-pairs) are in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The regression reported in column 7 includes individual dummies for all plurilateral PTAs and CUs.

Table 3. HMR two-stage estimation with CYFE. Sample period 1990, 1993, 1996, 1999, 2002, 2005, 2008.

Variables	HMR two-stage estimation with CYFE		
	(1)	(1)	(2)
	Probit coefficient	Marginal effects	ML
Ln Dist <sub>ij</sub>	-0.664 (0.012) <sup>***</sup>	-0.215 (0.004) <sup>***</sup>	-1.166 (0.022) <sup>***</sup>
Cont <sub>ij</sub>	0.137 (0.086)	0.042 (0.025)	0.558 (0.074) <sup>***</sup>
Lang <sub>ij</sub>	0.328 (0.021) <sup>***</sup>	0.097 (0.006) <sup>***</sup>	0.347 (0.036) <sup>***</sup>
Colony <sub>ij</sub>	1.607 (0.192) <sup>***</sup>	0.250 (0.007) <sup>***</sup>	0.961 (0.085) <sup>***</sup>
ComCount <sub>ij</sub>	1.356 (0.147) <sup>***</sup>	0.238 (0.008) <sup>***</sup>	2.450 (0.118) <sup>***</sup>
Island <sub>ij</sub>	0.190 (0.034) <sup>***</sup>	0.058 (0.010) <sup>***</sup>	0.427 (0.069) <sup>***</sup>
Land <sub>ij</sub>	-0.339 (0.023) <sup>***</sup>	-0.113 (0.008) <sup>***</sup>	-0.855 (0.051) <sup>***</sup>
CReligion <sub>ij</sub>	0.163 (0.028) <sup>***</sup>	0.053 (0.009) <sup>***</sup>	0.396 (0.047) <sup>***</sup>
CU <sub>ijt</sub>	0.616 (0.123) <sup>***</sup>	0.156 (0.022) <sup>***</sup>	
RTAPLur <sub>ijt</sub>	0.313 (0.039) <sup>***</sup>	0.092 (0.010) <sup>***</sup>	0.787 (0.049) <sup>***</sup>
RTABil <sub>ijt</sub>	0.409 (0.082) <sup>***</sup>	0.117 (0.020) <sup>***</sup>	0.266 (0.045) <sup>***</sup>
AGOA <sub>ijt</sub>	0.538 (0.438)	0.141 (0.086)	0.120 (0.358)
CBI			-0.178 (0.339)
ATPA			0.276 (0.273)
EBA <sub>ijt</sub>	0.572 (0.061) <sup>***</sup>	0.148 (0.012) <sup>***</sup>	0.560 (0.094) <sup>***</sup>
ACP-EU <sub>ij</sub>	0.617 (0.040) <sup>***</sup>	0.158 (0.008) <sup>***</sup>	0.492 (0.076) <sup>***</sup>
GSPEU <sub>ij</sub>	0.816 (0.044) <sup>***</sup>	0.193 (0.007) <sup>***</sup>	0.599 (0.064) <sup>***</sup>
GSPUSA <sub>ij</sub>	1.266 (0.176) <sup>***</sup>	0.231 (0.012) <sup>***</sup>	0.764 (0.227) <sup>***</sup>
GSPAustralia <sub>ij</sub>	-0.128 (0.137)	-0.043 (0.048)	-0.504 (0.282) <sup>**</sup>
GSPCanada <sub>ij</sub>	0.882 (0.123) <sup>***</sup>	0.196 (0.016) <sup>***</sup>	0.357 (0.190) <sup>**</sup>
GSPJapan <sub>ij</sub>	1.366 (0.138) <sup>***</sup>	0.238 (0.008) <sup>***</sup>	0.811 (0.240) <sup>***</sup>
GSPNZ <sub>ij</sub>	0.011 (0.109)	0.004 (0.035)	-0.474 (0.220) <sup>**</sup>
GSPNorway <sub>ij</sub>	0.685 (0.129) <sup>***</sup>	0.167 (0.021) <sup>***</sup>	0.392 (0.231) <sup>*</sup>
GSPRussia <sub>ij</sub>	0.439 (0.244) <sup>*</sup>	0.120 (0.054) <sup>*</sup>	-0.820 (0.279) <sup>***</sup>
GSPSwitzerland <sub>ij</sub>	1.044 (0.129) <sup>***</sup>	0.214 (0.013) <sup>***</sup>	0.362 (0.191) <sup>*</sup>
GSPTurkey <sub>ij</sub>	-0.179 (0.123)	-0.061 (0.044)	0.512 (0.208) <sup>**</sup>
ETA			1.312 (0.045) <sup>***</sup>
DELTA			0.147 (0.031) <sup>***</sup>
No observat.		166,370	106,870
Pseudo-R <sup>2</sup>		0.45	

Notes: Robust standard errors (clustered by country-pairs) are in parentheses.\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 4. Country year fixed effects estimations of the gravity equation. Effect on benefactor countries exports. Sample period 1990, 1993, 1996, 1999, 2002, 2005, 2008.

Variables	(1)	(2)	(3)	(4)
Ln D <sub>ij</sub>	-1.235 (0.020)***	-1.219 (0.020)***	-1.225 (0.020)***	-1.234 (0.020)***
Cont <sub>ij</sub>	0.624 (0.075)***	0.658 (0.076)***	0.639 (0.076)***	0.606 (0.076)***
Lang <sub>ij</sub>	0.365 (0.036)***	0.361 (0.037)***	0.356 (0.037)***	0.352 (0.037)***
Colony <sub>ij</sub>	1.268 (0.084)***	1.315 (0.085)***	1.288 (0.086)***	1.290 (0.086)***
ComCount <sub>ij</sub>	2.636 (0.116)***	2.709 (0.115)***	2.701 (0.115)***	2.605 (0.117)***
Island <sub>ij</sub>	0.452 (0.071)***	0.441 (0.071)***	0.443 (0.071)***	0.446 (0.071)***
Land <sub>ij</sub>	-0.834 (0.052)***	-0.837 (0.052)***	-0.824 (0.052)***	-0.841 (0.052)***
CReligion <sub>ij</sub>	0.385 (0.048)***	0.404 (0.048)***	0.410 (0.048)***	0.420 (0.048)***
CU <sub>ijt</sub>	-0.080 (0.110)	-0.176 (0.110)	-0.128 (0.110)	-0.120 (0.110)
RTAPlur <sub>ijt</sub>	0.916 (0.052)***	0.876 (0.052)***	0.905 (0.052)***	0.901 (0.053)***
RTABil <sub>ijt</sub>	0.385 (0.045)***	0.395 (0.046)***	0.324 (0.046)***	0.315 (0.046)***
UPR <sub>ijt</sub>	0.301 (0.049)***			
GSP <sub>ij</sub>		0.339 (0.054)***		
OtherGSP <sub>ij</sub>			0.040 (0.086)	
AGOA <sub>ijt</sub>		-0.274 (0.335)	-0.097 (0.367)	-0.098 (0.367)
CBI <sub>ij</sub>		0.632 (0.323)**	0.549 (0.344)	0.552 (0.343)
ATPA <sub>ij</sub>		1.127 (0.238)***	0.869 (0.284)***	0.867 (0.285)***
EBA <sub>ijt</sub>		0.149 (0.094)	0.225 (0.094)**	0.214 (0.094)**
ACP-EU <sub>ij</sub>		0.145 (0.074)**	0.216 (0.075)***	0.217 (0.075)***
GSPEU <sub>ij</sub>			0.708 (0.050)***	0.474 (0.063)***
GSPUS <sub>ij</sub>			0.848 (0.155)***	0.787 (0.232)***
GSPAustralia <sub>ij</sub>				-0.690 (0.289)**
GSPCanada <sub>ij</sub>				0.205 (0.202)
GSPJapan <sub>ij</sub>				0.746 (0.244)***
GSPNZ <sub>ij</sub>				-0.607 (0.238)**
GSPNorway <sub>ij</sub>				0.282 (0.237)
GSPRussia <sub>ij</sub>				-0.774 (0.278)***
GSPSwitzerland <sub>ij</sub>				0.221 (0.188)
GSPTurkey <sub>ij</sub>				0.117 (0.211)
MUPR <sub>ijt</sub>	0.451 (0.044)***			
MGSP <sub>ij</sub>		0.475 (0.045)***		
MOtherGSP <sub>ij</sub>			0.127 (0.074)*	
MAGOA <sub>ijt</sub>		-0.239 (0.138)*	-0.097 (0.164)	-0.095 (0.165)
MCBI <sub>ij</sub>		0.771 (0.175)***	0.723 (0.200)***	0.720 (0.199)***
MATPA <sub>ij</sub>		0.662 (0.146)***	0.464 (0.169)***	0.453 (0.169)***
MEBA <sub>ijt</sub>		0.154 (0.066)**	0.035 (0.067)	-0.038 (0.067)
MACP-EU <sub>ij</sub>		0.021 (0.055)	0.125 (0.056)**	0.130 (0.056)**
MGSP-EU <sub>ij</sub>			0.708 (0.049)***	0.703 (0.050)***
MGSPUS <sub>ij</sub>			0.848 (0.155)***	0.848 (0.156)***
MGSPAustralia <sub>ij</sub>				-0.215 (0.256)
MGSPCanada <sub>ij</sub>				0.434 (0.159)***
MGSPJapan <sub>ij</sub>				0.153 (0.235)***
MGSPNZ <sub>ij</sub>				-0.036 (0.191)
MGSPNorway <sub>ij</sub>				0.106 (0.152)
MGSPRussia <sub>ij</sub>				-0.350 (0.278)
MGSPSwitzerland <sub>ij</sub>				0.559 (0.186)***
MGSPTurkey <sub>ij</sub>				-0.370 (0.151)**
No observat.	106,870	106,870	106,870	106,870
Adj-R <sup>2</sup>	0.67	0.67	0.67	0.68

Notes: Regressand: log of real bilateral exports. Robust standard errors (clustered by country-pairs) are in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

## Appendix

Table A1: Sample of countries.

Albania	Dominican Republic	Liberia	Seychelles
Algeria	Ecuador	Libya	Sierra Leone
Angola	Egypt	Lithuania	Singapore
Antigua and Barbuda	El Salvador	Macedonia	Slovak Republic
Argentina	Equatorial Guinea	Madagascar	Slovenia
Armenia	Estonia	Malawi	Solomon Islands
Australia	Ethiopia	Malaysia	Somalia
Austria	Fiji	Maldives	South Africa
Azerbaijan	Finland	Mali	Spain
Bahamas	France	Malta	Sri Lanka
Bahrain	French Polynesia	Mauritania	St. Kitts and Nevis
Bangladesh	Gabon	Mauritius	Sta. Lucia
Barbados	Gambia	Mexico	St. Tome and Principe
Belarus	Georgia	Moldova	St. Vincent and Gr.
Belgium-Luxembourg	Germany	Mongolia	Sudan
Benin	Ghana	Morocco	Suriname
Bermudas	Greece	Mozambique	Swaziland
Bolivia	Grenada	Myanmar	Sweden
Bosnia and Herzegovina	Guatemala	Nepal	Switzerland
Brazil	Guinea	Netherlands	Syria
Bulgaria	Guinea Bissau	Netherlands Antilles	Tajikistan
Burkina Faso	Guyana	New Caledonia	Tanzania
Burundi	Haiti	New Zealand	Thailand
Cambodia	Honduras	Nicaragua	Togo
Cameroon	Hungary	Niger	Tonga
Canada	Iceland	Nigeria	Trinidad and Tobago
Cape Verde	India	Norway	Tunisia
Central African Republic	Indonesia	Oman	Turkey
Chad	Iran	Pakistan	Turkmenistan
Chile	Iraq	Panama	Uganda
China - Mainland	Ireland	Papua New Guinea	Ukraine
China – Hong Kong	Israel	Paraguay	United Arab Emirates
China – Macao	Italy	Peru	United Kingdom
Colombia	Jamaica	Philippines	United States of America
Comoros	Japan	Poland	Uruguay
Congo, D.R.	Jordan	Portugal	Uzbekistan
Congo, Republic of	Kazakhstan	Qatar	Vanuatu
Costa Rica	Kenya	Reunion	Venezuela
Croatia	Kiribati	Romania	Vietnam
Cyprus	Korea	Russia	Yemen
Czech Republic	Kuwait	Rwanda	Zambia
Côte d'Ivoire	Kyrgyz Republic	Samoa	Zimbabwe
Denmark	Laos	Saudi Arabia	
Djibouti	Latvia	Senegal	
Dominica	Lebanon	Serbia and Montenegro	