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The trade impact of European Union agricultural preferences

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Abstract

We assess the impact on agricultural trade of European Union (EU) trade policies, using a gravity model based on disaggregated trade flows from 161 developing countries (DCs) to 15 EU member countries. We use a sample selection framework to account for potential selection bias of positive trade flows and provide an explicit measure for relative preference margins. From a policy perspective, our results debunk some of the most widespread criticisms of preferential policies: EU preferences matter and have a positive impact on DCs agricultural exports at both the extensive and intensive margins, although with significant differences across sectors.

Keywords: Preferential Trade Policy; Agricultural Trade; Gravity Model; European Trade Policy.

JEL classification: F13, Q17, F14

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1. Introduction

This work analyses the impact on trade of European Union (EU) tariff preferences in the agricultural sector. The EU’s preferential treatment includes reduction or, in many cases, elimination of tariff barriers on imports from developing countries (DCs). The role of the agricultural sector is crucial in most DCS economies. According to the *World Development Report 2008* (World Bank 2008), in most sub-Saharan African countries this sector employs 65% of the labour force and generates 32% of gross domestic product (GDP) growth. In transforming countries, such as China, India, and Morocco, agriculture contributes on average only 7% to GDP growth, but lagging rural incomes are a major source of political tensions. In urbanized countries, mainly in Latin America and the Caribbean and Eastern Europe and Central Asia, agriculture contributes just 5% of GDP growth on average; however, rural areas are still home to 45% of the poor, and agribusiness and food services account for as much as one third of GDP. The EU, notwithstanding its high market protection, is the world’s biggest importer accounting for roughly 20% of world imports. It has implemented several preferential regimes in order to promote the economic development and integration of DCs in the world economy, and exports from DCs represent around 60% of total EU agricultural imports.

The Generalized System of Preferences (GSP) and other non-reciprocal preferential regimes, rely on the concept of “Trade as Aid”. Since the 1970s, Trade as Aid has been thought to be an effective way to promote development. Some critics claim that non-reciprocal preferences have perverse effects (Borchert, 2009); while others criticize preferential trade policies as being ineffective. It has been suggested that preferences are not effective due to their limited scope and because they
exclude goods that are important for DCs economies; that many unilateral agreements are temporary and introduce an element of uncertainty which is unfavourable to investment and the creation of long-term trade flows; that the administrative costs of proving eligibility for preference negate some of the margins, while rules of origin limit the benefits (Panagariya, 2002). These claims are supported by the fact that preferential tariffs have not generated significant trade flows (Brenton and Ikezuki, 2005). However, econometric results are ambiguous, and there is some evidence that preferences do have significant positive effects on growth (Romalis, 2003): in Section 2.3, we provide a brief review of the studies dealing with EU policies.

In the rest of the paper, we assess the impact of EU agricultural preferences in terms of trade flows, including traditional non-reciprocal agreements as well as the preferential access also granted to developing countries under bilateral reciprocal arrangements (Section 2). Following Anderson and van Wincoop (2004), we derive a theoretically grounded gravity equation in which the trade cost factor depends on bilateral distances, tariffs and preferential margins (Section 3.1). Most empirical analyses use gravity models with aggregated data, but using aggregate trade flows to analyse the effects of trade preferences applied at product level seems misleading. This paper contributes to the research that attempts to assess the various determinants of bilateral trade at sectoral level, based on highly disaggregated data (Baldwin et al., 2005; de Frahan and Vancauteren, 2006; Cardamone, 2008; Chevassus-Lozza et al., 2008; Disdier et al., 2008; Olper and Raimondi, 2008; Emlinger et al., 2008).

From a policy perspective, we aim to provide an assessment of the effectiveness of EU preferential trade policies in generating trade from DCs. That is, the aim is not to investigate whether preferences are damaging to recipient countries, to other (excluded) developing countries, or to the multilateral trading system itself, but to verify the claims that preferences have no impact because they have not helped the recipients to either gain market share or diversify their exports. Moreover, based on product level results, we highlight in which sectors more generous preferences may boost trade, and where preference erosion may have the largest impact.
Methodologically, the paper makes three main contributions. The first is a more refined measure for trade preferences compared to the binary variables commonly used in the literature. In particular, we measure preference margins in relative rather than absolute terms and our definitions focus on actual preferences with respect to possible competitors, rather than measuring theoretical margins with respect to “bound” Most Favoured Nation (MFN) tariffs (i.e., the ceiling set by the World Trade Organization (WTO) commitments). Thus, we avoid possible overestimation of the competitive advantages enjoyed by exporting countries, although the impact of prohibitive tariffs is underestimated since we consider only actual not potential exporters.

The second contribution of the paper is to provide a micro-level assessment of the impact of trade preferences on the intensive and the extensive margins of trade. We estimate this impact by modelling bilateral EU imports at the Harmonized System 6-digit level (HS6), allowing for heterogeneous trade costs and substitution elasticities across industries. The use of disaggregated data raises two problems: (i) the impossibility, for some variables, to obtain information at the level of detail at which tariff lines are specified; (ii) the large percentage of ‘zero trade flows’, which introduces obvious problems in the log-linear form of the gravity equation. In terms of (i), in order to control for unobservable country and product heterogeneity, we introduce exporter, importer, and product-specific fixed effects. We address the issue of zero flows by adopting the Heckman (1979) sample selection model (Section 3.2). This approach allows us to assess the impact of preferences on both numbers of bilateral trade flows (extensive margin) and quantities traded (intensive margin).

The third contribution of the paper is to assess the impact of the preference margins taking into account what is the share of preferential flows on total imports. Although we do not know the utilization rates of different schemes, the use of the available information on actual preferential trade flows allows us to provide improved estimates of the impact of trade preferences on EU agricultural imports from DCs (Section 3.3).
Our findings point to a significant, but heterogeneous impact of EU trade policy on DCs agricultural exports. The preferential regimes have positive impacts on both the extensive and intensive margins, although increased probability of trade is modest and increases in the intensity of trade vary widely across sectors (Section 4). These differences confirm the importance of studying their impact based on detailed and explicit measures for the preference margins. Section 5 discusses the implications of our results and draws some conclusions.

2. EU Preferential Trade Policies

2.1. EU agricultural imports

DCs agricultural exports include a wide range of goods (87% of the possible total number, i.e. 689) and a share of around 60% of total EU agricultural imports. Figure 1 shows shares of EU agricultural imports from DCs according to tariff regime typologies. Almost half of agricultural products enter duty-free under MFN arrangements, but the share of animal products, cereals and vegetables in MFN duty-free imports is much lower; of the imports that incur MFN duty, around 30% benefit from positive preference margins.

Figure 1 also shows the size of the differences across commodity groups: the share of preferential imports ranges from 6% for animal products, to almost 52% (mostly duty-free) in the case of tobacco. Fruit and vegetables (48%) and other food products (46%) make up a large share of preferential imports, while only slightly more than 10% of total flows of cereals and tropical products are preferential. However, in the case of tropical products, most (88%) imports are duty free, while cereals and animal product imports generally incur positive MFN duties.

Table 1 presents the percentage of tariff lines associated with positive trade, subject to MFN or preferential duties: in both cases, we distinguish between duty free (columns 1 and 3) and positive tariffs (columns 2 and 4). To give an idea of utilization rates, we compute the percentage of tariff lines where some preferential imports are registered (in parenthesis in columns 3 and 4). Considering the total number of preferential tariff lines (duty-free and with positive duty), more
than 60% of tariff lines could (potentially) benefit from preferential treatment, but preferences are applied in only half of these cases.

The share of preferential tariff lines is especially low in the case of animal products, dairy and beverages. If we compare the percentages in Table 1 with those in Figure 1, we can see that the share of preferential trade is significantly lower than the share of preferential tariff lines, and this holds even if we limit the comparison to the preferences actually used.

2.2. Major EU preferential schemes

The EU is part of a web of preferential trade relations with other countries and regional groupings, ranging from the traditional GSP to the Everything But Arms (EBA) initiative for the Least Developed Countries (LDCs), the Lomé/Cotonou agreements with the Africa-Caribbean-Pacific (ACP) countries, and the Bilateral Euro-Mediterranean Association Agreements (Bureau et al., 2004; Gallezot, 2005).

In this brief review, we focus on EU preferential schemes granted in the period 2003-2005. The EU GSP scheme includes three main categories of benefits: the General Scheme introduced in 1971, which offers imports from DCs, access to EU markets at low or zero tariffs; the EBA initiative, which grants to the LDCs duty-free access for all products except arms and munitions; and the ‘GSP-plus’, which provides tariff reductions and exemptions to DCs that implement international conventions on human and labour rights, environmental protection, drug abuse and good governance. In 2004, the percentage of agro-food tariff lines covered by the GSP, EBA and GSP-plus were 45%, 68% and 99%, respectively (De Maria et al., 2008).

The regular GSP covers around 7,000 tariff lines. Products are classified into two groups according to the depth of the tariff cuts: non-sensitive products (3,300), which receive duty-free market access, and sensitive products (3,700) (including most agricultural products), which benefit from a flat rate reduction of 3.5 percentage points. The EBA considerably improved the extent of preferential market access granted to LDCs and, in 2002, duty-free access with no restrictions on
quantity was extended to all products except bananas, which have only been allowed since 2006, and rice and sugar where tariffs have been reduced gradually, to zero in 2009.

The Cotonou Agreement between the EU and 79 ACP countries came into force in April 2003 and replaced the previous Lomé Conventions, the first of which dated back to 1975. Under the Cotonou Agreement’s trade pillar, ACP countries benefit from non-reciprocal trade preferences, which apply to 99% of industrial goods and most agricultural products (special protocols were introduced for bananas, beef and sugar): tropical products which do not compete with European products enter the EU market duty free; temperate products are subject to an exemption or reduction in customs duty, but are subject to strict quotas, with fruit and vegetables subject to seasonal restrictions; other agricultural products are subject to quantity restrictions or are excluded from preferential treatment (Nilsson, 2008). In 2008, the unilateral preferences under the Cotonou Agreement were replaced by WTO-compatible, reciprocal full or interim EU Partnership Agreements, which progressively removed the barriers to trade and enhanced cooperation in all areas related to trade.

The EU has privileged relationships with its neighbouring countries, including 10 Mediterranean countries. The central element in European Neighbourhood Policy is the bilateral arrangements with each partner. The Euro-Mediterranean partnership was launched at the 1995 Barcelona Conference and foresaw a free trade area by 2010. The Bilateral Euro-Mediterranean Association Agreements are a first step in this direction. The EU has signed Association Agreements with Algeria, Egypt, Israel, Jordan, Lebanon, Morocco and Tunisia, while an interim Association Agreement governs relations between the EU and the Occupied Palestinian territory. These agreements allow for non-reciprocal, free access for non-sensitive products into the EU market, and progressive liberalization for other products.

In Table 2, the preference factor \((1 + \text{pref}_{ijk})\) is computed in relative terms, as the ratio of the maximum duty factor \((1 + \tau_{jk}^{\text{max}})\) actually applied by the importer \(j\) (i.e., EU member) to all possible exporters of product \(k\), and the duty \((1 + \tau_{ijk})\) incurred by a specific exporter \(i\):
As seen in the image, the text is a mathematical and economic analysis discussing the impact of tariff preferences on trade. The text includes several equations and points out that the preference factor can increase due to lower tariffs or due to higher duties on other exporters. It also highlights the importance of considering the lowest available preferential rate and the potential for overestimating preferential margins. The text then discusses the relative preferential factors across sectors, noting significant differences and the relative preference factors for specific sectors. Finally, it introduces an equation to calculate the preference rent for any sector $s$. The equation is:

$$V_s = \sum_k \sum_i (\tau^\text{max}_{jk} - \tau_{ik}) \text{prefImp}_{ik}$$

where $\text{prefImp}_{ik}$ refers to EU preferential imports of product $k$ from partner $i$. The text concludes by noting the complexity of calculating the preference rent and the importance of simplifying assumptions.
following, our estimates of the impact of the preferences on trade shed some light on the relevance of these two components.

The calculation of Equation (2) is likely to provide an upper bound estimate, since the assumption is that none of the rent is included in the export price. The value of EU agricultural preferences is equal to €1,350 million. This is a crude approximation. First, the assumption that there are no supply constraints is rather simplistic, since a change in the EU trade policy regime is likely to exert upward pressure on world prices, which would tend to counterbalance, to some extent, the decrease in prices due to preference margins. Moreover, the extent of rent extraction by an exporter is likely to depend on the exporter’s bargaining power vis-à-vis the importer. Nevertheless, this approximately allows the magnitude of the preferences to be compared across sectors. The rent for the fruit and vegetables sector alone amounts to almost half of the overall value, which is not surprising given the importance of this sector, but the connection between rent value and trade flow intensity generally is irregular.

2.3. Literature review

It is not easy to summarize the results from the large literature on the impact of trade preferences. Estimates vary due to the fact that different analyses and estimations use different data sets, sample sizes and independent variables. However, the expectation of a positive impact of preferences on trade is largely confirmed. With regard to the estimated coefficients of the impact of preferences, Nielsen (2003) and Cardamone (2007) provide comprehensive surveys of the estimated impact of preferential trade agreements, and many studies focus specifically on EU policies (Nilsson, 2002; Persson and Wilhelmsson, 2005; Verdeja, 2006).

The impact of the EU GSP scheme is difficult to define since estimates of the dummy coefficient range between 4% and 136% (Nilsson, 2002; Rose, 2004a; Persson and Wilhelmsson, 2005; Verdeja, 2006), and some studies even find highly significant negative coefficients (Nilsson, 2002; Rose, 2004b; Subramanian and Wei, 2005). In terms of the results for different sectors, Subramanian and Wei (2005) report positive estimates only for the clothing industry, and negative
estimates for the footwear and food sectors. Several studies (Nilsson, 2005; Persson and Wilhelmsson, 2005; Agostino et al., 2007) find that the EBA initiative provides a significant boost to LDCs exports and positive results have been obtained for the ACP countries (Nilsson, 2005; Persson and Wilhelmsson, 2005; Verdeja, 2006), and the Euro-Mediterranean agreements (Amurgo-Pacheco, 2006; García-Alvarez-Coque and Martí-Selva, 2006; Pusterla, 2007). Some authors focus on specific products and/or exporters, using highly disaggregated data: here we highlight some recent studies focusing on EU imports of fruit and vegetables, carried out by Cardamone (2008) and Emlinger et al. (2008).

There is a large group of studies that try to quantify the benefits that receiving countries draw from trade preferences (Alexandraki and Lankes, 2004; Bouët et al., 2005; Dean and Wainio, 2006). Yamazaki (1996) finds that, at world level, the value of preference margins represents 12% of the total value of preferential exports, 73% of which is accounted for by EU preferential schemes. Tangermann and Josling (1999) find that, in terms of the percentage of exports (to the EU), the value of preferences is highest for beef and sugar and lowest for cereals and fresh fruit. Candau and Jean (2005) claim that EU tariff preferences are important to a number of DCs, especially those in sub-Saharan Africa: for all country groups except the GSP-only countries, they represent a significant proportion of the value of dutiable exports to the EU (up to 10% for the sub-Saharan African and LDCs).

Although EU preferences might be considered rather generous, they are accompanied by complex rules relating to origin, which are seen as a major obstacle for exporters of processed goods. Thus, their rate of utilization has attracted substantial research (Gallezot and Bureau, 2004; Anson et al., 2005; Estevadeordal and Suominen, 2005). It is largely acknowledged that in sectors characterized by restrictive non-tariff barriers (quotas, administrative burdens, sanitary and phytosanitary regulations) generous preferences do not seem to be important in increasing trade (Bureau et al., 2004; Desta, 2008; Iimi, 2007). If we examine each agreement separately, we can see that the rates of utilization are quite low. However, it has also been pointed out that DCs exports are often
eligible for more than one preference scheme, and not all can be exploited at the same time (Bureau et al., 2004, 2007). We should mention here the study by Manchin (2005), which has several methodological features in common with the present work (highly detailed trade data, explicit preference margins, and the Heckman two-step procedure), but a different focus, namely the determinants of ACP preference utilization, and a different definition of preference margin.

3. Econometric model

3.1. Specification

We start from a standard constant elasticity of substitution (CES), monopolistic competition model following Lai and Trefler (2002) and Lai and Zhu (2004). A trade separable model, in which allocation of the value of production and expenditure in country j for product class k, is separable from the bilateral allocation of trade across countries (Armington assumption), allows us to determine bilateral trade in a conditional general equilibrium, where the product markets for each good produced in each country, are conditional on the observed output structure and expenditure allocations.

Following Anderson and van Wincoop (2004) we derive our gravity equation including many commodity classes of goods (denoted by k where k=1,2,…K) flowing between each country i and j:

\[
m_{ijk} = \frac{Y_{ik} E_{jk}}{Y_{wk}} \left( \frac{T_{ijk}}{P_{ik} P_{jk}} \right)^{1-\sigma_k}
\]

where \( m_{ijk} \) is the nominal demand for commodity k of country i by country j; \( Y_{ik} \) is the production of commodity k for country i; \( E_{jk} \) is the country j’s expenditure for product k; \( Y_{wk} \) is world production of product k; \( T_{ijk} \) is the trade cost; \( P_{ik} \) and \( P_{jk} \) are multilateral price indexes, and \( \sigma_k > 1 \) is the elasticity of substitution among all varieties, from different exporters.

There are three main approaches to multilateral price terms: (1) use of published data on price indexes (Bergstrand, 1985, 1989; Baier and Bergstrand, 2001); (2) direct estimation à la Anderson and van Wincoop (2003); (3) use of country fixed effects (Eaton and Kortum, 2002; Feenstra, 2002). The main weakness of the first method is that existing price indexes may not reflect true
border effects accurately (Feenstra, 2002). Direct estimation à la Anderson and van Wincoop (2003) requires the (non-linear) estimation of a structural equation in which multilateral resistance indexes are expressed as a function of the observable variables. The use of importer and exporter fixed effects in the estimation is widely used in the literature referred to in the previous section, since it is a computationally easier way to account for multilateral price terms in cross section analysis. In our case, to account for product specific characteristics, we also include product-specific fixed effects.

The trade cost factor, $T_{ijk}$, reflects the impact of transport costs, proxied by distance ($d_{ij}$), common language ($L_{ij}$) and colonial links ($C_{ij}$), and trade policies, proxied by the ad valorem equivalent tariff factor imposed by country $j$ on imports of commodity $k$ from country $i$ ($t_{ijk}=1+\tau_{ijk}$):

$$T_{ijk} = t_{ijk} d_{ij} e^{\delta_1 L_{ij} + \delta_2 C_{ij}}$$

where $L_{ij} = 1$ if $i$ and $j$ share a common language; and $C_{ij} = 1$ if $i$ and $j$ are linked by colonial ties.

Trade preferences reduce border costs as a consequence of tariff reduction. In the case of preferential imports, then, the trade cost is a function of the preference factor: higher preferences decrease trade cost and, thus, reduce the negative trade impact of the bilateral tariffs. Since we are interested in assessing the trade impact of preferences, this work is grounded in an explicit measure of the intensity of the preference margins at the 6-digit tariff line level, defined in equation (1).

Using (1) and (4) and rewriting equation (3) in logarithmic form, we get:

$$\ln Y_{jk} = \alpha - \ln Y_{wk} + \ln E_{jk} + \mu (1-\sigma_k) \ln d_{ij} + \delta (1-\sigma_k) L_{ij} + \delta (1-\sigma_k) C_{ij} + (1-\sigma_k) \ln (1+\tau_{ijk}) MFN +$$

$$+ [\sigma_k - 1] \ln P_{jk} \text{PRE} + \ln Y_{wk} \text{PRE} + \sigma_k \ln P_{jk} + \nu_{jk} + \epsilon_{jk}$$

(5).

The variable $\tau_{mfn}^{\text{mn}}$ is associated with the dummy $\text{MFN}$ which is equal to 1 if imports enter without claiming any preferences; the variables $\tau_{jk}^{\text{max}}$ and the preference factor variable $(1+\text{pref}_{ijk})$ are associated with the dummy $\text{PRE}$ which is equal to 1 in the case of preferential trade flows. Since $\tau_{mfn}^{\text{mn}}$, $\tau_{jk}^{\text{max}}$, and $Y_{wk}$ do not vary across exporters, in the estimation they are proxied by product
fixed effects. Similarly, the estimated dummies for exporter and importer replace $Y_{ik}$ and $E_{jk}$ in equation (5).

3.2. Estimation

The large percentage of zero trade flows associated with the use of highly disaggregated data create obvious problems in the log-linear form of the gravity equation. In many cases, the solution to the ‘zero flows’ problem is simply to drop from the data set the pairs with zero trade, and estimate the log-linear form using ordinary least squares. Even ignoring the fact that the omission of zero flows greatly reduces the sample and leads to a considerable loss of information, limiting the analysis to observations with positive bilateral trade flows introduces a significant source of bias. In fact, zero flows might reflect not only unobservable trade values due to rounding up errors or missing observations, but also are likely to be the result of economic decision making based on the potential profitability of engaging in bilateral trade.

Some authors suggest using the Poisson Quasi Maximum Likelihood estimator to deal with the problem of zeros in the trade matrix, in order to achieve unbiased and consistent estimates. For instance, Santos Silva and Tenreyro (2005) recommend that gravity type models, as well as other constant-elasticity models, should be estimated in multiplicative form, and suggest a simple quasi-maximum likelihood estimation technique based on a Poisson regression (Siliverstovs and Schumacher, 2007). A recent work by Martin and Pham (2008) uses Monte Carlo generated data in order to investigate the performance of different estimators. It appears that the Poisson estimator is severely biased, while the Heckman (1979) two stage procedure performs well if true identifying restrictions are available. Accordingly, we implement the Heckman two-step procedure.

The Heckman two-step approach transforms the selection bias problem into an omitted variable problem, which can be solved by including an additional variable, the inverse Mills ratio ($\lambda$), between the regressors. The two stage approach not only corrects for possible biases, it also allows us to distinguish the impact of preferences on the extensive as well as the intensive margins. An increased probability of registering a positive trade flow, signals the existence of a larger set of
bilateral trade flows (extensive margin), and can reflect either a larger variety of goods traded or a larger number of exporters of the same good. On the other hand, the coefficient associated with the preference margin, in the second stage refers to trade in larger quantities than would have been the case without the preference (intensive margin).

In practice, in the first stage we estimate the following probit model:

$$\rho_{ijk} = \Pr (m^*_{ijk} > 0 \mid d_{ij}, \text{pref}_{ijk}, L_{ij}, C_{ij}, \text{product and country-specific fixed effects}) \quad \text{(6).}$$

The existence of positive trade flows should be affected by fixed rather than variable trade costs: Helpman et al. (2007), for instance, include the variable _common religion_ in the first-stage regression, although they acknowledge that a common language indicator would be just as useful. Indeed, cultural factors, and especially a common language, are well-known determinants of trade.

We posit that the additional complexity inherent in an intermediated relationship, the potential for costly errors, and the increased cost may be large enough to prevent some transactions. Accordingly, the dummy $L_{ij}$ for common language, provides the required identifying restriction: in the second stage we estimate a modified version of equation (5) dropping the language dummy and adding the inverse Mills ratio estimated in the first stage.

Finally, we compute the percentage change due to the hypothetical elimination of existing preferences as follows (Lai and Zhu, 2004):

$$\text{Preference effect} = \sum_{ijk} (E[m_{ijk} \mid \text{pref}_{ijk} > 0] - E[m_{ijk} \mid \text{pref}_{ijk} = 0]) / \sum_{ijk} E[m_{ijk} \mid \text{pref}_{ijk} > 0] \quad \text{(7).}$$

In calculating these results, we estimate the counterfactual change in the dependent variable, total EU imports, which would follow from the removal of the preferential advantage. This could be considered the ‘trade creation’ effect, since the trade flow would not take place in the absence of preferences. However, such an effect cannot be interpreted in welfare terms, since the additional trade flows may be the result of the diversion of previously existing exports from other countries (Borchert, 2009). Moreover, this calculation may overestimate the total sum of foregone exports, since indirect effects are not captured via changes in world prices.
3.3 Data

We estimate cross-sectional models, covering imports of 689 agricultural commodities based on the WTO definition, from 161 DCs, to 15 ‘old’ EU member countries. The number of observations is 476,105 rather than 1,663,935 (15 importers*161 exporters*689 products) since products that are never exported, either to the EU15 or to any other country, are dropped from the sample. Data on trade at the HS6 level of detail are taken from the Eurostat Comext database (http://fd.comext.eurostat.cec.eu.int/xtweb/); data on tariffs are from the MAcMapHS6-V2 database (http://www.cepii.fr/). MAcMap provides a consistent worldwide assessment of protection, including ad valorem equivalent rates of specific duties and tariff rate quotas (including those introduced at the end of the Uruguay Round), for 2004, at the HS6 level (Boumelassa et al., 2009).

The Comext database does not provide information on the utilization of each preference scheme. However, it distinguishes preferential and non-preferential (MFN) trade. Using the information on preferential trade flows, the level of duty ($\tau_{ijk}$) used for the computation of the preference margins is equal to the MFN (applied) tariff if the preference is not used, and to the preferential (bilateral) tariff otherwise. Accordingly, our estimation will take account of the volume of trade benefiting from the preferences, and avoid overestimation of the preference impact that can arise from the association between a positive preference and a trade flow that does not exploit it.

In order to reduce the impact of bilateral trade flow volatility, we take average trade values for the period 2003-2005. This choice would be questionable if preferential and MFN trade were hit by idiosyncratic shocks, but given that changes in total and preferential trade values are strictly correlated in our database, we assume that any year-specific exogenous shocks will have similar impacts on both sets of values.

Comext trade values are cif (cost, insurance and freight) values, which raises some problems in terms of their consistency, since they will be correlated with the error term (Cardamone, 2007; Pusterla, 2007). We convert trade values to fob (free on board) values using a similar approach to that implemented by the International Monetary Fund (IMF) (see Direction of Trade Statistics...
Since the MAcMap database includes both cif and fob trade flows, we compute cif/fob ratios (at the HS6 level) and obtain fob values by dividing the Comext trade figures by these ratios.

The MAcMap dataset displays 3,425 tariff rate quotas (TRQ) trade flows corresponding to around 12% of total EU agricultural imports from DCs. Depending on the fill rate level, there are three possible market regimes: if the fill rate is less than 90%, the quota is not binding and the marginal tariff used is the in-quota tariff; in the range 90%-98%, the quota is binding and the marginal tariff is the simple average of the in-quota and out-of-quota tariffs; if fill rate is higher than 98%, the marginal tariff is equal to the out-of-quota tariff (Boumelassa et al., 2009). In the last case, we split the tariff line into two observations in order to account for the different margins.

Data for the remaining explanatory variables are from the Cepii dataset, which includes distances between countries and two sets of dummies for – a common language, and former colonial links. We run separate regressions for nine commodity groups defined according to the WTO Multilateral Trade Negotiations categories: these groups cover more than two-thirds of EU agricultural imports from DCs. The choice to run separate regressions is quite common in studies estimating gravity equations at sectoral level (Baldwin et al., 2005; Lai and Trefler, 2002), and seems appropriate, since we find evidence of significant differences in substitution elasticities across industries (Lai and Trefler, 2002).

Several categories – such as, chemicals, flowers, skins, animal feedstuffs, and miscellaneous products – do not benefit from preferences: these products account for almost 26% of EU agricultural imports from DCs. Also, we do not present the results for sugar: preferences in this sector differ markedly from regular preferences since they give to certain countries (mostly ACP) the possibility to benefit from domestic support prices, up to agreed quantities, and it is difficult to estimate the impact on trade flows given the existence of import quotas. Note, also, that although quotas were in place for banana and beef preferences, unlike the case of sugar, in neither of these cases were the quotas binding in 2004.
4. Results

Table 3 presents the results for total EU agricultural imports and the impact of preferences on trade; Tables 4-6 present the results by commodity groups. These partial regressions provide interesting insights, and can be considered to be robustness checks based on the sample split. It should be recalled that all regressions are based on detailed data at the HS-6 product level.

Regarding the estimates based on preferences: in the first stage, this is the impact on the probability of registering a positive trade flow; in the second stage, it can be interpreted as a measure of the responsiveness of trade flows to the intensity of the relative preferential margins (defined as the ratio of the maximum applied duty factor by importer $j$ across all exporters on product $k$, and the duty incurred by a specific exporter $i$). The first stage allows us to estimate the impact of preferential policies on the extensive margin, i.e., the share of positive agricultural trade flows originating from DCs, over the total number of possible bilateral trade flows. The second stage quantifies the extent to which trade preferences have increased the volume of DCs exports.

The results in Table 3 confirm that preferential access leads to a significant expansion in trade between the EU and DCs, in terms of both the extensive and the intensive margins. In the first stage, all control variable estimates show the expected signs. The negative impact of distance, our proxy for transport costs, on the probability of exporting a larger set of products is more than compensated for by the existence of a common language and the presence of colonial links.

The estimated coefficient of 0.06 implies that a 10% increase in the relative preference factor – roughly corresponding to an average reduction of 10 percentage points in the bilateral applied tariffs at the estimation point – increases the probability of registering a positive trade flow (i.e., the extensive margin) by 6%. This change may not be dramatic, but the positive (and highly significant) sign contradicts the received wisdom that due to preferential policies, exporting countries specialize in a small number of products which may not coincide with their true comparative advantages and which are characterized by low value added. Although we cannot draw any conclusions about eventual welfare impacts related to comparative advantages and value added, our results show that
the number of products exported by a given number of countries, or the number of countries exporting a given number of products, is likely to increase as a consequence of EU preferential policies.

In the second stage, the positive and significant coefficient of the Mills ratio confirms that correcting for sample selection bias is justified. The estimates for distance and colonial links have the expected signs, although the coefficients are larger than the values reported in most previous studies. It should be remembered, that few gravity models using industry or product level data tend to provide higher distance effects values than estimations using aggregated data (Disdier and Head, 2008). The reason for this strong response is that the reduced form coefficients in equation (5) subsume the impact of the substitution elasticity $\sigma$. We next focus on the main variable of interest in this study - with an estimated coefficient of around 3, preferential imports respond more than proportionally to variations in preferential tariff rates. The estimated preference effect (computed according to equation (7)) is over 2%, which means that the absence of preference would reduce bilateral trade volumes between DCs and the 15 EU member countries by €1,358 million. This is not a trivial figure, and is larger than the value of the preference rent itself (see Table 2). On the other hand, it is only a small share (around 8%) of the value of preferential exports to the EU. This means that hypothetically, the removal of the preferences would not affect the vast majority of current flows.

The estimated coefficient implies a substitution elasticity across all commodities, $\hat{\sigma}_k = \hat{\beta}_k + 1$, equal to 3.75. This value is within the ranges in the literature: notwithstanding different methodologies, estimation techniques and levels of aggregation, we can say that based on previous studies there is a ‘consensus range’ which includes values of $\sigma$ of between 3 and 11 (Baier and Bergstrand, 2001; Eaton and Kortum, 2002; Lai and Trefler, 2004; Olper and Raimondi, 2008).

In terms of the results for different commodity groups, Table 4 provides some insights into the consequences of preferential policies for the extensive margin.
In almost all cases, preferences significantly increase the probability of exporting to EU markets, with the exception of dairy, where the coefficient is significant only at the 10% level. The increase in the probability of registering a positive trade flow as a consequence of preference treatment, varies between 3% for fruit and vegetables and 18% for tobacco. These differences are obviously related to the structure of the applied tariffs as well as the preference margins. A low impact of the probability of registering a positive trade flow is obviously related to the small preference margins granted to tropical products, oils and fats, and fruit and vegetables. However, the extensive margin also shows a low impact for animal products, which are characterized by high applied tariffs notwithstanding the large preference margins. Finally, it should be remembered that the number of products in each sector is very uneven: as a consequence, there are 48,622 trade flows on 78,188 bilateral imports in the case of the fruit and vegetables and only 4,560 tobacco trade flows on 7,333 possible imports.

The coefficients of bilateral distance, language and colonial links are consistent with those in Table 3, and in both steps of the estimations (Tables 4 and 5). There are large differences across sectors for all the estimated coefficients, which could be explained by large differences across sectors in terms of the perishability of the exported products, or transport constraints. These results support our decision to run separate rather than a pooled regression, since the latter would have implied unwarranted restrictions on the trade cost coefficients.

The estimates for the elasticity of substitutions are statistically significant for six out of nine classes of goods (Table 5). Almost all the significant estimates are within the ranges in previous studies, with the exception of tropical products, which reaches a value of 16. Such high substitutability among country varieties at this highly disaggregated level is not inconceivable, and could be interpreted as the consequence of less product heterogeneity in certain sectors. From this perspective, the most differentiated sectors seem to be those where results are not significant: oils and fats, animal products, and dairy. These would also be the sectors where DCs have less to gain from a possible extension of the preference margins (notwithstanding the high duties applied to
dairy and animal products, see Table 2). On the other hand, it should be noted that the largest estimated elasticities are for those sectors, as tropical products, beverages and tobacco, that incur rather low duties (even without the benefits of large preference margins), with the possible exception of beverages where there might be room for further liberalization on a preferential basis.

Table 6 presents computations of the percentage change in total imports due to the hypothetical elimination of existing preferences according to equation (7); it shows the results only for those sectors with a statistically significant estimated preference impact. The sectors excluded –, oils and fats, animal products, and dairy – are those where existing preferential schemes seem to affect only the extensive margin. Indeed, notwithstanding the rather large relative margins, most imports incur positive MFN duties (Figure 1). In the case of animal products and dairy, non-tariff barriers, such as quotas, administrative burdens, and restrictive sanitary and phytosanitary regulations, are likely to play a much larger role than tariffs, so tariff preferences alone are not sufficient to access EU markets. On the other hand, it could be argued that if these sectors do not benefit from the preferences in place, they also might not suffer from their erosion. However, it is possible that these sectors might have vested interests in multilateral liberalization not being introduced: for instance, share of animal products in total preference rent (Table 2) is quite significant (10%).

As a general comment, the sum of the values reported in Table 6 largely exceeds the overall impact estimated in Table 3, since trade flows due to preferences add up to €2,305 million, which means that around 14% of EU preferential trade (i.e., 3.7% of total agricultural imports from DCs) would not take place without preferences. This is a consequence of the highly differentiated impact estimated in Table 5, since each sector is characterized by a very different substitution elasticity.

The impact of EU preferences is around 2% in the case of beverages, cereals, and tobacco; around 6% in the case of tropical and other food products; and over 9% for fruit and vegetables. For the first group, preferences increase export flows only marginally in absolute terms. However, in the case of beverages and tobacco, preference margins are significant and lead to significant rents, while for cereals, preferential exports are much smaller, but up to a quarter is dependent on actual
margins. Moreover, since a large share of DCs cereals exports incur high MFN duties (Figure 1), DCs exports might benefit from more generous preferential policies.

Tropical products and other food products show similar trade effects, but these are due to low margins and high elasticity in case of the former, and the reverse in the case of the latter. However, given the differences in trade flows (Figure 2), the trade volume generated by preferences is much larger in the case of tropical products and represents more than 50% of preferential trade: however, it should be recalled that preferential trade represents only 11% of EU imports, while 88% already enjoy MFN duty free access. In terms of other food products, there is some room to increase or extend the preferences for the 38% of imports still subject to positive duties (Figure 1). However, DCs may be fearful about loss of rents, which represent 12% of the import value.

Fruit and vegetables represent a very large share (27%) of DCs exports to the EU, and is the sector most affected by EU agricultural preferences: it accounts for 64% of ‘preference-generated’ trade flows and around half of total rents. These figures are impressive, although it should be remembered that the use of annual data ignores seasonality, which is one of the main characteristics of this sector and plays an important role in the EU protection system (Cardamone, 2008; Emlinger et al., 2008).

5. Conclusions

Over time, the EU has instituted a number of preferential schemes for DCs exports, in order to integrate these countries into world trade and to promote their economic growth. In this paper we focus on the agricultural sector since DCs exports represent a significant share of EU agricultural imports. Our objective was to assess the impact of preferential margins on trade flows, using a gravity equation approach in order to identify the contribution of preferential policy to deviations from ‘normal’ trade levels.

Our results show robust estimates for the impact of EU preferences on bilateral trade flows. We control for possible biases in three dimensions: measurement of the intensity of the (relative)
preference margins, impact on the extensive as well as on the intensive margins of trade, distinction between preferential and MFN trade flows.

Methodologically, our study confirms that there is little support for the use of aggregated data and that when using disaggregated data, the estimations should be conducted on a sector-by-sector basis. Comparison of sector estimates with estimates for the overall agricultural sector, shows that the latter is likely to be underestimated due to the assumption of common impacts of trade costs across sectors.

Working at the most detailed level allowed by the data increases the problem of zero trade flows. In line with the most recent evidence, we deal with this problem by applying a Heckman correction approach and controlling for selection bias due to the presence of zeros.

We quantify the intensity of the preference margins, rather than relying on a simple dummy. In order to emphasize the advantage granted with respect to other importers, preferential margins are computed for each product, as the difference between the highest tariff applied by EU and the actual duty paid by each exporter.

From a policy perspective, preferential tariff rates for exports to the EU are aimed at enabling DCs to participate more fully in international trade and to generate additional export revenues to support the development of industry and jobs and to reduce poverty. In this paper, we investigate whether the EU’s trade preferences in the area of agri-food trade have been effective in stimulating additional exports from recipients eligible for preferential duties. The issue is contentious, and widely debated in the literature, and this paper provides new evidence showing that preferential schemes have a significant impact on trade. First, preferences influence the extensive margins of trade since we show that there is a significant increase in the probability of registering a positive trade flow. This implies that countries benefiting from preferential schemes export a larger set of goods; also, some recent work points to the contribution of export variety to growth (Broda and Weinstein, 2006). This impact ranges from 2% for dairy to 18% for tobacco. In terms of the impact
on trade volumes, we find that EU agricultural imports increased as a consequence of preference margins, by more than €2 billion, or almost 14% of preferential trade flows.

The results for different commodity groups may have some implications for policy, although they should be used with caution since trade negotiations assume a lot more than just the magnitudes of some of the coefficients. DCs may be concerned about the consequences of preference erosions, either in terms of the negative impact on trade – in the case of tropical and other food products, and especially fruit and vegetables – or loss of rents – in the case of animal products, beverages and tobacco. On the other hand, there is room for a deepening of the current schemes, given that a significant share of EU imports from DCs still incur positive duties. From this perspective, negotiations to increase preference margins are likely to be most effective in the case of cereals, other food products, and fruit and vegetables, while additional preferences may not increase exports in those sectors, and especially in animal products and dairy, where technical, sanitary, phytosanitary standards and traceability requirements, set by public or private bodies, are very high.
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Washington, DC

FIGURES

Figure 1. Share of EU agricultural imports by type of tariff regime (2003-2005)
Figure 2. Compositions of EU agricultural imports from DCs (2003-2005)
## Tables

### Table 1. Share of EU agricultural tariff lines by type of tariff regime (period 2003-2005)

<table>
<thead>
<tr>
<th>15 EU members</th>
<th>% of MFN duty-free</th>
<th>% of MFN duty (no preference)</th>
<th>% of Preferential duty-free</th>
<th>% of Preferential duty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Potential (Used)(^a)</td>
<td>Potential (Used)(^a)</td>
</tr>
<tr>
<td>All Agricultural Sectors</td>
<td>30</td>
<td>5</td>
<td>25 (17)</td>
<td>40 (20)</td>
</tr>
<tr>
<td>Animal products</td>
<td>25</td>
<td>8</td>
<td>11 (8)</td>
<td>56 (12)</td>
</tr>
<tr>
<td>Beverages</td>
<td>42</td>
<td>2</td>
<td>16 (10)</td>
<td>40 (16)</td>
</tr>
<tr>
<td>Cereals &amp; cereal preparation</td>
<td>6</td>
<td>5</td>
<td>16 (11)</td>
<td>74 (25)</td>
</tr>
<tr>
<td>Animal and vegetable oils &amp; fats</td>
<td>15</td>
<td>45</td>
<td>19 (14)</td>
<td>21 (11)</td>
</tr>
<tr>
<td>Tobacco</td>
<td>17</td>
<td>5</td>
<td>45 (29)</td>
<td>33 (16)</td>
</tr>
<tr>
<td>Tropical products</td>
<td>48</td>
<td>4</td>
<td>34 (21)</td>
<td>14 (6)</td>
</tr>
<tr>
<td>Fruit &amp; vegetables</td>
<td>17</td>
<td>5</td>
<td>25 (18)</td>
<td>53 (30)</td>
</tr>
<tr>
<td>Dairy</td>
<td>11</td>
<td>26</td>
<td>16 (11)</td>
<td>47 (15)</td>
</tr>
<tr>
<td>Other food products</td>
<td>17</td>
<td>7</td>
<td>28 (21)</td>
<td>48 (25)</td>
</tr>
</tbody>
</table>

Data refer to tariff lines with positive trade flows; \(^a\) The numbers in parenthesis indicate the percentage of preferential tariff lines that enter in EU under a preferential scheme.
Table 2. Value and preference margins for commodity groups with preferential trade flows

<table>
<thead>
<tr>
<th>15 EU members</th>
<th>Bilateral applied tariff ( %)(^a)</th>
<th>Preference factor (1+(pref_{ijk}))(^a)</th>
<th>Value of preference (MI €)</th>
<th>Total trade volume (MI €)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal products</td>
<td>31</td>
<td>1.73</td>
<td>132</td>
<td>3701</td>
</tr>
<tr>
<td>Beverages</td>
<td>11</td>
<td>1.14</td>
<td>110</td>
<td>1929</td>
</tr>
<tr>
<td>Cereals &amp; cereal preparation</td>
<td>20</td>
<td>1.23</td>
<td>31</td>
<td>1720</td>
</tr>
<tr>
<td>Animal and vegetable oils &amp; fats</td>
<td>4</td>
<td>1.07</td>
<td>41</td>
<td>4508</td>
</tr>
<tr>
<td>Tobacco</td>
<td>4</td>
<td>1.16</td>
<td>136</td>
<td>1824</td>
</tr>
<tr>
<td>Tropical products</td>
<td>1</td>
<td>1.04</td>
<td>10</td>
<td>9934</td>
</tr>
<tr>
<td>Fruit &amp; vegetables</td>
<td>7</td>
<td>1.10</td>
<td>636</td>
<td>16062</td>
</tr>
<tr>
<td>Dairy</td>
<td>19</td>
<td>1.22</td>
<td>9</td>
<td>457</td>
</tr>
<tr>
<td>Other food products</td>
<td>8</td>
<td>1.25</td>
<td>245</td>
<td>2022</td>
</tr>
<tr>
<td>All Above Sectors</td>
<td>8</td>
<td>1.14</td>
<td>1,350</td>
<td>42,157</td>
</tr>
</tbody>
</table>

\(^a\) Simple averages
Table 3. Overall results – 15 EU members imports

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Probit regression, marginal effects $Pr(m_{ijk} &gt; 0)$</th>
<th>Heckman Selection $ln m_{ijk}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimated coefficients</td>
<td>Estimated coefficients (Robust Standard Errors)</td>
</tr>
<tr>
<td><strong>Intercept ($\alpha$)</strong></td>
<td>-</td>
<td>60.7*** (5.14)</td>
</tr>
<tr>
<td>$ln d_{ij}$</td>
<td>-0.06***</td>
<td>-11.3*** (0.75)</td>
</tr>
<tr>
<td>$ln (1+pref_{ijk})$</td>
<td>0.06***</td>
<td>-</td>
</tr>
<tr>
<td>$ln (1+pref_{ijk})*PRE$</td>
<td>-</td>
<td>2.75*** (0.88)</td>
</tr>
<tr>
<td>$C_{ij}$</td>
<td>0.04***</td>
<td>7.59*** (0.53)</td>
</tr>
<tr>
<td>$L_{ij}$</td>
<td>0.04***</td>
<td>-</td>
</tr>
<tr>
<td>$\lambda$</td>
<td>-</td>
<td>12.6*** (1.22)</td>
</tr>
</tbody>
</table>

Elasticity of substitution, $\sigma$: 3.75
Preference effect: 2.2%
Trade volume (Ml. EUR): 1.358

N. of obs.: 433917
Prob $> X^2$: 0.00
Pseudo $R^2$: 0.31
Rho ($\rho_{\epsilon \mu}$): -
Sigma ($\sigma_{\epsilon}$): 12.6

Notes: (*) significant at 10% level; (**) significant at 5% level; (***) significant at 1% level;
Importer, Exporter and product specific-fixed effects; Fixed effect coefficients not reported.
<table>
<thead>
<tr>
<th>Commodity Groups</th>
<th>Independent Variables</th>
<th>N. of obs.</th>
<th>Prob &gt; $X^2$</th>
<th>Pseudo R²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ln d_{ij}$</td>
<td>$ln(1 + pref_{ijk})$</td>
<td>$C_g$</td>
<td>$L_{ij}$</td>
</tr>
<tr>
<td>Animal products</td>
<td>-0.03***</td>
<td>0.04***</td>
<td>0.02***</td>
<td>0.01*</td>
</tr>
<tr>
<td>Beverages</td>
<td>-0.04***</td>
<td>0.13***</td>
<td>0.07***</td>
<td>0.06***</td>
</tr>
<tr>
<td>Cereals &amp; cereal preparation</td>
<td>-0.08***</td>
<td>0.12***</td>
<td>0.16***</td>
<td>0.05</td>
</tr>
<tr>
<td>Animal and vegetable oils &amp; fats</td>
<td>-0.06***</td>
<td>0.14***</td>
<td>0.03***</td>
<td>0.02***</td>
</tr>
<tr>
<td>Tobacco</td>
<td>-0.09***</td>
<td>0.18***</td>
<td>0.02</td>
<td>0.04**</td>
</tr>
<tr>
<td>Tropical</td>
<td>-0.07***</td>
<td>0.04***</td>
<td>0.04***</td>
<td>0.04***</td>
</tr>
<tr>
<td>Fruit &amp; vegetables</td>
<td>-0.11***</td>
<td>0.03***</td>
<td>0.04***</td>
<td>0.05***</td>
</tr>
<tr>
<td>Dairy</td>
<td>-0.04***</td>
<td>0.02*</td>
<td>0.03***</td>
<td>0.02*</td>
</tr>
<tr>
<td>Other food products</td>
<td>-0.06***</td>
<td>0.07***</td>
<td>0.06***</td>
<td>0.05***</td>
</tr>
</tbody>
</table>

Notes: 15 EU members imports; (*) significant at 10% level; (**) significant at 5% level; (***)) significant at 1% level; Importer, Exporter and product specific-fixed effects; Fixed effect coefficients not reported.
Table 5. Results for commodity groups – Intensive margin

<table>
<thead>
<tr>
<th>Heckman Selection</th>
<th>Independent Variables</th>
<th>N. of obs.</th>
<th>Elasticity of substitution, $\sigma$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ln m_{ijk}$</td>
<td>$ln d_{ij}$</td>
<td>$ln (1+pref_{ijk}) \times PRE$</td>
<td>$C_{ij}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal products</td>
<td>-8.94***</td>
<td>0.67</td>
<td>3.13**</td>
</tr>
<tr>
<td></td>
<td>(3.06)</td>
<td>(3.27)</td>
<td>(1.63)</td>
</tr>
<tr>
<td>Beverages</td>
<td>-6.44***</td>
<td>7.22***</td>
<td>-2.27**</td>
</tr>
<tr>
<td></td>
<td>(1.70)</td>
<td>(2.63)</td>
<td>(1.10)</td>
</tr>
<tr>
<td>Cereals &amp; cereal</td>
<td>-6.60***</td>
<td>3.81**</td>
<td>6.25***</td>
</tr>
<tr>
<td>preparation</td>
<td>(1.90)</td>
<td>(1.89)</td>
<td>(1.09)</td>
</tr>
<tr>
<td>Animal and vegetable</td>
<td>-6.59***</td>
<td>2.38</td>
<td>1.37</td>
</tr>
<tr>
<td>oils &amp; fats</td>
<td>(2.67)</td>
<td>(5.70)</td>
<td>(1.31)</td>
</tr>
<tr>
<td>Tobacco</td>
<td>-7.41***</td>
<td>7.89***</td>
<td>2.76**</td>
</tr>
<tr>
<td></td>
<td>(2.19)</td>
<td>(2.67)</td>
<td>(1.32)</td>
</tr>
<tr>
<td>Tropical</td>
<td>-11.1***</td>
<td>15.9**</td>
<td>7.79***</td>
</tr>
<tr>
<td></td>
<td>(1.28)</td>
<td>(7.17)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>Fruit &amp; vegetables</td>
<td>-19.9***</td>
<td>3.66***</td>
<td>12.5***</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(0.79)</td>
<td>(0.47)</td>
</tr>
<tr>
<td>Dairy</td>
<td>-10.3**</td>
<td>4.99</td>
<td>-1.99</td>
</tr>
<tr>
<td></td>
<td>(4.87)</td>
<td>(3.84)</td>
<td>(3.75)</td>
</tr>
<tr>
<td>Other food products</td>
<td>-9.39***</td>
<td>3.90***</td>
<td>7.90***</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(0.74)</td>
<td>(0.49)</td>
</tr>
</tbody>
</table>

Notes: 15 EU members imports; Robust standard errors in parenthesis; (*) significant at 10% level; (**) significant at 5% level; (***) significant at 1% level; Importer, Exporter and product specific-fixed effect; Intercept and fixed effect coefficients not reported.
Table 6. The estimated preference effect – Results for commodity groups

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Preference effect</th>
<th>Trade volume (Ml €)</th>
<th>% of Preferential trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverages</td>
<td>1.4%</td>
<td>27</td>
<td>4%</td>
</tr>
<tr>
<td>Cereals &amp; cereal preparation</td>
<td>2.5%</td>
<td>43</td>
<td>24%</td>
</tr>
<tr>
<td>Tobacco</td>
<td>2.3%</td>
<td>42</td>
<td>4%</td>
</tr>
<tr>
<td>Tropical</td>
<td>6.0%</td>
<td>596</td>
<td>54%</td>
</tr>
<tr>
<td>Fruit &amp; vegetables</td>
<td>9.2%</td>
<td>1478</td>
<td>19%</td>
</tr>
<tr>
<td>Other food products</td>
<td>5.9%</td>
<td>119</td>
<td>13%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-</td>
<td>2,305</td>
<td>14%</td>
</tr>
</tbody>
</table>