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ROMA TRE UNIVERSITÀ DEGLI STUDI

Analysing the Impact of EBA Initiative Using a Gravity Model•

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Abstract This paper assesses the effectiveness of the Everything But Arms (EBA) initiative launched by the EU in 2001. It evaluates whether EBA has been effective in increasing exports from LDCs to the EU. The study considers the period 1995-2006. After arguing that the impact of trade preferences should be estimated by using disaggregated trade flows rather than aggregated trade, the analysis is carried out by considering five products (cloves, coffee, crustaceans, molluscs and vanilla beans) which meet three criteria relating to the export intensity of LDCs, the actual preferences of EBA and the intra-year distribution of EU tariffs. Furthermore, the export share of the 5-selected goods with respect to national exports is never marginal and, in many cases, is higher than 60%. From an econometric perspective, we improve the reliability of results by giving great attention to the econometric setting and to measurement of the preferential treatment. The evidence differs from one product to another and this supports the decision to work using disaggregated data because it allows us to gauge the sector specificities which would be hidden when analysing total trade. Results show a positive impact on the exports of crustaceans and vanilla of the preferential treatment granted by the EU under EBA, whereas the evidence is un-conclusive when considering the other three products.

JEL codes: O50, O19; F13; C33
Keywords: Trade preferences; EBA initiative; gravity model; panel data

1. Introduction

As trade is widely recognised to be an engine of growth, developed countries have implemented a patchwork of trade agreements under which preferential treatment is granted to exports from developing countries (DC). It is expected that trade preferences determine an increase in exports from preference-receiving countries to the market of preference-donor countries vis-à-vis other suppliers. The EU, with its high number of trade preferential arrangements signed with DC, is firmly committed to the promotion of trade with virtually all DC and, through its trade cooperation policy, aims to make a meaningful contribution to

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stimulating export-led strategies in DC. One important scheme which has been adopted by the EU in order to offer preferential access to DC is the Generalised System of Preferences (GSP). This dates back to the early '70s when the United Nations Conference on Trade and Development (UNCTAD) recommended the creation of a 'Generalised System of Tariff Preferences' to be implemented by each industrialised country. The EU's GSP was adopted in 1971 for a period of ten years and has been renewed several times, with revisions involving the number of GSP arrangements and the products and countries covered, as well as the tariff cuts. The current GSP, which was renewed in 2008 for a three-year period, comprises three arrangements: the ordinary GSP, the GSP plus and a special agreement for Least Developed Countries (LDCs). While only non-sensitive products enter the EU duty-free under the ordinary GSP and additional benefits are granted under GSP plus to countries implementing certain international standards of human and labour rights, environmental protection, good governance and the fight against drugs, the special arrangement in favour of LDCs provides tariff free and quota free access to all EU imports from the 49 LDCs as defined by the UN,[1] except for arms and ammunition. This is the reason why the agreement is known as EBA, Everything But Arms. Besides the comprehensive product-coverage of this new initiative, other differences with respect to ordinary GSP and the GSP plus are that it will be maintained for an unlimited period of time and will not be subject to the periodic renewal of the Community's scheme of generalized preferences (Council Regulation EC No 2501/2001).

EBA was launched by EU in 2001[2] and its goal is to boost LDC growth by removing all trade restrictions when they export to the EU market. However, even though EBA provides the best market access for LDC exports, its effectiveness is not assured for several reasons. Some of these reasons, such as the weak supply capacity of LDCs or the weak institutional capacity of

[1] A country is classified as an LDC if it meets three criteria based on low-income (3-year average GNI per capita of less than US $905, which must exceed $1,086 to leave the list), weakness of human resources (based on indicators of nutrition, health, education and adult literacy) and economic vulnerability (based on instability of agricultural production, instability of exports, economic importance of non-traditional activities, export concentration and the percentage of population displaced by natural disasters). Countries may "graduate" out of the LDC classification when indicators exceed these criteria. Two countries which have graduated from the LDC status were Botswana in 1994 and Cape Verde in 2007. The classification currently (as of 29th January 2009) applies to 49 countries.

[2] All tariffs and quotas on LDCs exports were eliminated in 2001, except for those on bananas, rice and sugar. The removal of import duties applied by the EU in these three sectors was progressively implemented by 2006 in the case of bananas, and by 2009 for rice and sugar.

LDCs to effectively manage all the administrative issues in order to apply for a trade preference, are external to EBA, while others, like the strict Rules of Origin (RoO), are internal to the new EU initiative. In addition, granting full market access does not necessarily translate into increased exports from LDCs because of trade arrangements which pre-existed EBA. For instance, the 36 LDCs which are also part of the Cotonou agreement may prefer to export under the Cotonou agreement rather than under EBA, even though tariffs are zero in both schemes. This is for two reasons. The first is that EBA does not introduce particular improvements regarding entry conditions into the EU market with respect to the Cotonou agreement (tariffs faced by African, Caribbean and Pacific countries (ACPs)[3] were already very low or zero for a large number of commodities). In other words, many products exported by ACPs did no gain any additional tariff preference from the new initiative. The same reasoning may be made for those LDCs which already enjoyed duty-free access to EU under the ordinary GSP. The second reason refers to the evidence that the RoO of the arrangement signed by ACPs are far less restrictive than those under EBA. This would make the use of EBA preferences more difficult and costly than the use of other preferential treatments (i.e, Brenton 2003; UNCTAD 2003).

All these considerations, however, do not necessarily mean that EBA is uneffective in encouraging LDC exports to the EU. This remains an open question which will be addressed in this paper. One method of evaluating whether a preferential treatment encourages the exports of preferred countries is the gravity equation. This model, in its basic form, posits the idea that trade is positively affected by the economic mass of the trading countries, which is gauged by their GDP and population, and negatively influenced by the geographical distance between them. The appeal of the gravity equation derives from the opportunity it offers for modelling deviations from the normal pattern of trade, where normal is simply meant to be the trade determined by the variables usually referred to as gravitational variables (GDP, population and distance) in the absence of any other disturbance. Deviations from the normal level of trade are captured by augmenting the model with all the factors that may hinder or promote bilateral trade flows, such as a common border, language, religion, or past colonial ties. Preferential trade policies certainly belong to this kind of factor because they entail

[3] The EEC and the ACP countries signed their first agreement, the Yaoundé Convention, in 1969. In 1975, the Yaoundé agreement was replaced by the Lomé Convention, followed by the Cotonou Partnership Agreement in 2000. The latter agreement was replaced by the Economic Partnership Agreement (EPA) in 2008.

unilateral reductions in trade barriers granted by developed to DC. Hence, other things being equal, they are expected to stimulate exports from DC to the preference-giving country, so yielding a higher flow of trade than that which would "normally" be expected.

The literature which aims at explicitly analysing the impact of EBA by using the gravity approach is rather limited in quantity. It is comprised of the papers by Pishbahar and Huchet-Bourdon (2008), and Gradeva and Martinez-Zarzoso (2009). These studies share the use of aggregated data, i.e. total exports from LDCs to the EU, and the use of a dummy variable as proxy for the preferential policy (this dummy is 1 if the country benefits from EBA and 0 otherwise). From an econometric point of view, Pishbahar and Huchet-Bourdon (2008) use the OLS estimator, while Gradeva and Martinez-Zarzoso (2009) consider the Heckman (1978) procedure in order to control for selection bias due to many zero trade flows. These two works conclude that EBA is not effective in increasing LDC exports to the EU.

The aim of this paper is to provide further evidence in this field of research by attempting to improve the reliability of results obtained when evaluating the effectiveness of EBA within the analytical framework of the gravity approach. With this aim, the empirical setting considers three key issues regarding the use of disaggregated data of trade flows, the measurement of trade preferences and the econometric estimators to be employed.

With regards the data aggregation on which the evaluation of EBA effectiveness ought to be based, we argue that, in general, the use of total exports is not adequate for evaluating the impact of a trade policy instrument – the preferential treatment - which is conceived to be applied at the product level (see, among many others, Agostino et al. 2010). Indeed, the main objective of any Preferential Trade Agreement (PTA) such as EBA is to alter the incentives for beneficiaries to export more in specific sectors (those in which preferences are granted). This implies that the correct empirical strategy to follow in evaluating the effectiveness of EBA is to use trade statistics at the level of data disaggregation which is parallel to the level at which trade preferences are defined. This has two advantages. On one hand, it allows us to understand whether and to what extent the preferential treatment granted by the EU to LDCs through EBA enhances the exports of tariff-triggered products. In this respect, if EBA treatment induces an increase in exports in the sectors for which it makes a difference to market access, the evaluation of the effectiveness of the scheme will be positive, even though aggregate exports from LDCs to EU do not significantly change. In addition, the evidence

based on disaggregated data does not suffer from the shortcoming relating to the aggregation of tariffs, which, on the contrary, restricts the reliability of results obtained when the gravity equation is estimated using total trade flows [on the bias due to the aggregation of tariffs see, for instance, Cipollina and Salvatici (2008) and Anderson and Neary (2005)]. As a study cannot analyse all products, given that the amount of data to be elaborated would be enormous (in 2009 EBA covered 7,140 HS10-digit products), a selection of products must be made. In this paper, we focus on a group of products at HS4-digit which have been selected by considering three conditions.[4] The first condition refers to the existence of an export capacity of LDCs before 2001. The rationale underlying this hypothesis is that if, in the short run, no radical change in the production and export structure of LDCs may occur, then a removal of tariffs determines a short run effect which can only be picked up in the empirical analysis if the preferred countries were able to export before EBA was implemented. Therefore, we ordered all HS4-digit goods by the LDCs' exports share of the world market in 2000, that is before EBA was in force, and selected products with a market share higher than 4%. The second condition is that GSP tariffs applied by the EU are positive. This ensures that, for the products selected, EBA introduced a real gain in terms of tariff preferences. The rationale for this criterion is that, obviously, it would be pointless to evaluate EBA by considering individual products with respect to which the EU already guarantees free access under GSP. Finally, we excluded from the study the products with intra-year variability of tariffs because, in such a case, one has to use monthly data on exports and tariffs, thereby increasing exponentially the size of the data to be analysed. Furthermore, the recourse to monthly data would require addressing the issue of seasonality (Cardamone, 2009) which is hard to deal with when monthly time series involve many missing values, as is the case with a number of LDC exports.

The HS-4 level products which satisfied the above mentioned three conditions are cloves, vanilla beans, coffee, crustaceans and molluscs. Bearing in mind that we are analysing the most vulnerable countries in the world, it is extremely important to point out that many LDCs

[4] The decision to select the products at HS-4 digit level was taken basically because of the necessity to work, at this stage of the research, with groups of commodities which are homogeneous enough to capture LDCs' sectoral specialisation in production and exports. At the same time, the HS4-digit level is aggregated enough to limit the amount of information which needs to be elaborated in the descriptive section of the paper. On the other hand, in order to guarantee that the level of data disaggregation regarding the trade flows is parallel to that of preferential tariffs, the successive econometric analysis will be based on data at HS-8 digit level.

heavily depend on the exports of these five products. For instance, in 2006, exports of coffee accounted for 40,85% of Ethiopia's total exports, about 35% of Rwanda's and 16% of Burundi's. At the same time, the exports of crustaceans made up 21,2% of Madagascar's total exports and 3,81% of Mozambique's. In 2006, molluscs represented 4.3% of the total exports of Senegal, the exports of cloves were 4.2% of Bangladesh's total exports and the exports of vanilla made up about 5% of Madagascar's total exports. Even though we are limiting the analysis to a very restricted sample of products, these figures allow us to say that the selected commodities are really important for some individual countries. Given that the shares of each of these products are not marginal, any increase in their exports surely has an impact on total exports; if this increase can be attributed to the preferential treatment under EBA, then it will be possible to say that the scheme is pro-development.

Limiting the analysis to the literature which explicitly investigates the role of EBA by using the gravity model, the second innovation of this paper regards the variable used to measure the trade preferences granted by the EU under different arrangements (EBA, GSP, agreements in favour of ACP, Regional Trade Agreements). The proxy for preferential treatment that we consider is the margin of preferences, rather than a dummy variable. Due to data availability, this approach is becoming more popular in this field of research, being followed, for instance, by Cardamone (2009) Emlinger et al. (2009), Cipollina and Salvatici (2010), Aiello and Demaria (2009), Agostino et al. (2009), who, however, are mainly interested in studying trade issues other than the impact of EBA. In this paper, the margin of preference is measured by the difference between the MFN tariff and the preferential tariff granted under each specific trade arrangement and, therefore, is an explicit measure of the preferential treatment. This overcomes the caveat that dummies do not measure the level of trade preferences (i.e., if we had considered dummies for the different schemes, we would have implicitly assumed that the level of trade preferences under EBA would be the same as those under the Euro-Mediterranean or Cotonou Agreements).

Finally, the third distinguishing feature of the study regards the econometric methods used to estimate the gravity model. The methods employed control for heterogeneity, endogeneity and zero-trade flows. While a heterogeneity bias might be due to the likely correlation between specific country-pair fixed effects and regressors, endogeneity could arise because of the simultaneity between the dependent variable (EU imports) and the regressors. Hence, before using a fixed effect estimator, we first perform the Davidson-Mackinnon test, the

results of which suggest that the hypothesis of endogeneity of PTA variables may be rejected. As a consequence of this, we adopt a negative binomial model which, similarly to the Poisson model, controls for zero-trade and heteroskedasticity biases (Santos Silva and Tenreyro, 2006), but relaxes the heavily restrictive assumption regarding the identical mean and variance of the Poisson distribution.

We find mixed evidence with regards the results. When considering the group of LDCs which are also part of the Cotonou agreement, we find that during the years of the application of the new initiative, the exports of vanilla and crustaceans have been positively influenced by the trade preferences granted by the EU to LDCs. The same applies for the exports of crustaceans from the LDCs which are not part of the Cotonou agreement. Un-conclusive outcomes or outcomes opposite to the expected ones were found in the remaining cases.

The paper is organised as follows. Section 2 presents a descriptive analysis of LDC exports, section 3 introduces the gravity model and the estimation methods, while section 4 discusses the estimated results. Finally, section 5 concludes.

2. The exports of EBA to EU: a brief descriptive analysis

After the introduction of EBA, LDCs were expected to react to the new incentives by increasing, *ceteris paribus*, their EU import market share. This expectation is based on the fact that, under EBA, all products from LDCs, except arms and ammunitions, enjoy duty and quota free access to the EU (with the exception of bananas, sugar and rice for which there was a progressive implementation by 2006 for bananas and 2009 for rice and sugar). With respect to other exporters, LDCs should have improved their competitive position in EU markets because they now get higher prices in a protected market and this should have a positive impact on LDCs' incentive to export to the EU. Moreover, EBA is granted for an unlimited period, without periodical renewals, and this reduces uncertainty which, in turn, helps strengthen trade relationships between LDCs and the EU, because, amongst other things, it allows long-term investment strategies to be developed.

Table 1 presents LDCs' market shares regarding three levels of data aggregation (total exports, total agricultural exports and 29 HS2-digit products) for the EU as a whole, over the period 1998-2007.

With regards LDCs' total exports, what clearly emerges is that the market share shows an increasing trend from 1998 to 2005, with a substantial shift in 2002, while, more recently (2005-2007), they were stable around a value of 0.18%. On one hand, this evidence suggests that the market shares of LDCs have remained very low, but, on the other hand, we find that the relative importance of LDCs as suppliers to the EU-27 market registered, as expected, a substantial increase over the period under scrutiny: the 2007 market share was 0.184%, that is to say fivefold that of 1998 (0.038%). The increase in market share was similar when only agricultural exports are considered. LDCs' market shares are now higher than those regarding total trade, and this fact indicates the more relevant role of EBA for agricultural exports: agricultural market share was 0.089% in 1998, 0.16% in 1999 and increased by 0.4% per year, on average, over the period 2000-2007 (table 1).

A look at the 2-digit agricultural trade data reveals that the disaggregated picture is extremely confused, in the sense that only seven products (cereals, cereal-flour-starch-milk preparation and products, cocoa, live trees, edible vegetables, tobacco, edible fruit-nuts-peel of citrus-

melons) registered a clear increase in market shares after 2001. Market shares declined for other sectors (animal and vegetables fats, residual-wastes of food industry, animal fodder, vegetables-fruit-nut, meat, meat-fish and seafood preparations, lac-gums-resins-vegetable saps and extracts), while no clear pattern emerges for the remaining sectors (milling products, sugar and sugar preparations, and live animals) (table 1).

Although this examination may help understand the overall changes which have occurred in the capacity of LDCs to enter the EU market, it does not lead to any conclusion regarding the role of EBA. This is basically because changes in LDCs competitiveness in the EU market do not depend simply on trade preferences granted by EBA, but are also the consequence of other determinants, such as developments in other exporting countries. In addition, at this stage of the research, nothing may be said regarding EBA effectiveness because the HS2-digit level of data aggregation we consider in table 1 is still too high, in the sense that each group at HS2-digit level is composed of a large number of products, which are, in many ways, very different from each other. The main difference we are interested in regards the extent of trade barriers that LDCs face in exporting these commodities to the EU. Since tariffs are established at a very detailed level of data aggregation (trade restrictions are established by the EU at HS-10 digit level), the 2-digit trade statistics of table 1 may hide product-specific behaviours which we are interested in when evaluating the potential role of EBA. Again, we know that the EBA coverage in terms of preferential treatment is at the maximum level (all goods, except for arms and ammunitions, have unlimited free access to the EU), but there is a great difference within each 2-digit agricultural sector when comparing EBA with GSP and ACP tariffs. Indeed, as already mentioned, a tariff preference associated with EBA only exists if the preferential tariffs applied under other trade agreements are positive, and this can occur to a very different extent from one product to another, even within the HS2-digit groups.

Based on these arguments, we identified five products at the HS-4 level of aggregation on which the following empirical analyses is based. The selection was made by imposing three conditions which refer to the export intensity of LDCs at the HS4-digit level, the "size" of the additional preferential treatment provided by EBA and the absence of intra-year variability of EU import tariffs.

As for export intensity, we ordered the products at HS4-digit level in terms of LDCs' share of world exports in 2000. This ranking allows us to indentify a list of commodities, for which

LDCs exhibited a certain degree of market competitiveness before EBA came into force in 2001. From this ranking we choose the products for which LDCs' market share was higher than 4%, and apply the second criterion of selection to this sub-sample of products. The second condition is meant to identify the products which received an effective tariff advantage from EBA with respect to the pre-existing trade arrangements. In this sense, we restrict the sample to goods with a positive preferential tariff under the ordinary GSP regime, the most general preferential scheme for DCs implemented by the EU. Finally, in order to avoid the empirical issues deriving from the use of monthly data - for instance those due to the (i) large amount of missing values, (ii) size of the dataset and (iii) seasonality - we ignored all the commodities with a tariff calendar.

These three criteria yield a sample composed of the following five HS4-digit products: cloves, vanilla beans, coffee, crustaceans and molluscs. Table 2 presents details regarding the application of the three criteria used for selecting the commodities to be analysed.[5] The data displayed shows that the selected sample of products includes certain goods whose world market is largely dominated by exports from LDCs (the market share absorbed by these countries was 72% in the case of cloves and 65% for vanilla beans), while the other three products have a market share of 4-5% (coffee, molluscs and crustaceans) (table 2).

For each selected good, figures 1 and 2 show the absolute values and the market shares of LDCs' exports to the EU over the period 1995-2006. The five selected products exhibit very different patterns. For instance, total EU imports of cloves and vanilla from LDCs increased greatly immediately after 2000, but they suffered a sharp reduction in 2001 and 2003, respectively. However, with respect to total EU clove imports, those from LDCs decreased, on average, over the period 1995-2006, while LDC export-shares of vanilla beans alternated between decreasing and increasing annual changes (around an average share of around 0.7%). With regards coffee, the time-series of EU imports from LDCs (both in absolute and relative terms) was fairly stable, except for an unusual change between 1999 and 2000. Finally, EU

[5] Within the group of products with a market share above 4%, the exclusion of other products from the successive analysis was for the following reasons: ground-nut oil, copra, lac and gums, oil seed and live sheep were excluded because they have tariff free access to the EU under GSP, whereas nuts, peel of citrus and leguminous vegetables were excluded because they are subject to tariff seasonality (table 2).

imports of molluscs and crustaceans from LDCs increased up until 2000 and decreased after 2002 and 2003. The same applies for their export-shares (figures 1 and 2).

Another important issue to be addressed concerns the level of tariffs that countries face when exporting the selected products to the EU market. Figures 3-7 display the import tariffs under the four main EU preferential trade agreements, namely the ordinary GSP, the preferential tariffs granted to ACPs, the EBA and the average tariffs of Regional Trade Agreements (henceforth RTA) signed by the EU.

As shown in figures 3-7, GSP duties are higher than those applied under the other preferential schemes (EBA, Cotonou and RTA), whatever the product; this is the result of the tariff-triggered criterion we used in selecting the products, and provides us with a measure of the relative tariff advantage that LDCs would have enjoyed if they had exported under the EBA regime instead of reverting to GSP. Other evidence regards the fact that the duties levied on EU imports from ACPs are zero for the five products concerned. This fact gives further interest to the analysis because the group of LDCs can be split into two sub-samples. The first sub-sample comprises the 13 LDCs which are not part of the Cotonou agreement.[6] Before 2001 the exports from these 13 LDCs towards the EU market were levied according to the positive GSP-tariffs and, thus, the free market access they have been given under EBA has increased their competitiveness in the EU (we label these countries as $13LDC_{not\text{-}ACP}$). The second sub-sample is composed of the 36 LDCs which were also part of the Cotonou Agreement (henceforth $36LDC_{ACP}$).[7] For the 5 selected products, the $36LDC_{ACP}$ did not obtain any tariff advantage from the new scheme; the opposite is true for the $13LDC_{not\text{-}ACP}$ which moved from a regime of positive GSP-tariffs to the tariff-free and quota-free access granted by EBA. As far as the five selected sectors are concerned, it is reasonable to argue that the capacity of the $36LDC_{ACP}$ to enter the EU market did not change with the new preferential agreement. At the same time, it is likely that EBA exerts a certain influence in favour of the exports to the EU from the $13LDC_{not\text{-}ACP}$ because the import tariffs they currently face for the

[6] Afghanistan, Bangladesh, Bhutan, Cambodia, Djibouti, Kiribati, Lao People's Dem. Rep. Maldives, Nepal, Solomon Islands, Yemen, East Timor, Samoa.

[7] Angola , Benin, Burkina Faso, Burundi, Cape-Verde, Central African Republic, Chad, Comoros, Congo Dem. Rep, Equatorial-Guinea , Eritrea, Ethiopia, Gambia, Guinea, Guinea Bissau, Haiti, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao' Tomé and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Tanzania, Togo, Tuvalu, Uganda, Vanuatu, Zambia.

five products under scrutiny are zero, while the GSP duties they would have to pay without the EBA initiative would be positive.

As for the other preferential schemes, we find that in the cases of vanilla, coffee and cloves (except for 2000), there was no substantial difference between EBA (or ACP) and RTA tariffs (all of them were around zero). Finally, with regards the exports of molluscs and crustaceans, EBA attributed an effective tariff advantage with respect to those DCs which had signed a RTA.

3. Empirical setting: the gravity model and the estimation methods

In order to assess the effectiveness of the EBA initiative, we estimate the following multiplicative gravity equations over the period 1995-2006:

$$X_{ijt}^{s} = (GDP/POP)_{it}^{\alpha_1} \cdot (GDP/POP)_{jt}^{\alpha_2} \cdot (POP_{it})^{\alpha_3} \cdot (POP_{jt})^{\alpha_4} \cdot \exp(\alpha + \alpha_t + \alpha_{ij}^{s} + u_{ijt}^{s} + \delta_1 MTR_{it} + \delta_2 MTR_{jt} + \beta_1 GSP_{jt}^{s} + \beta_2 ACP_{jt}^{s} + \beta_3 RTA_{jt}^{s} + \beta_4 13LDC_{NotACP,jt}^{s,pre2001} + \beta_5 13LDC_{NotACP,jt}^{s,post2001} + \beta_6 36LDC_{ACP,jt}^{s,pre2001} + \beta_7 36LDC_{ACP,jt}^{s,post2001}) \quad [1]$$

where subscript *i* refers to the individual EU-15 importers (i=1,...,15), *j* to exporters (j=1,...191), *t* to the year (t=1995,...,2006), and *s* indicates the agricultural commodities, at HS8-digit level (see footnote 4), which are included in the five groups of aggregate products we selected at HS4-digit level.[8] X is the EU's import flow, GDP is the Gross Domestic Product, POP is the population. α^{s}_{ij} indicates the commodity-country pair fixed effects, while u^{s}_{ijt} is the error term.[9] The acronym MTR stands for Multilateral Trade Resistance and is meant to measure trade barriers that each country faces with respect to all its trading partners. As suggested by Anderson and van Wincoop (2003), bilateral trade should be higher between trading countries with relatively low trade barriers. We determine a proxy of multilateral trade resistance, following the approach proposed by Carrere et al. (2009), which extends the

[8] There is just one commodity at HS8-digit level within the HS4-digit of cloves and vanilla beans, while there are seven at HS8-digit level within the HS4-digit of coffee, thirty-one in the group of crustaceans and, finally, thirty-two products in the aggregation of molluscs.

[9] The gravity model specification used does not incorporate the country-pair background based on observable factors (distance, common border, common language, the number of landlocked countries in the pair, or past colonial ties) which can be handled using a set of dummy variables. This exclusion is due to the fact that the dummies relating to the above mentioned variables are time invariant and, thus, are absorbed by country-pair fixed effects.

multilateral resistance approximation used by Baier and Bergstrand (2009) to a panel framework. MTR terms for country *i* and country *j* are defined as $MTR_{it} = \sum_k \frac{GDP_{kt}}{GDP_{Wt}} \ln(DIST_{ik})$ and $MTR_{jt} = \sum_k \frac{GDP_{kt}}{GDP_{Wt}} \ln(DIST_{jk})$, where W is the world, i, j, k indicate the individual countries, t is time, GDP represents the Gross Domestic Product, $DIST_{ik}$ ($DIST_{jk}$) is the distance in km between the capitals of country *i* (*j*) and country *k*.

For each preferential variable (GSP, ACP, EBA and RTA) and each tariff-line, we compute the preferential margin as the difference between the applied MFN duty and the preferential duty granted under each specific trade arrangement. We address the overlapping of preferences by assuming that if a country benefits from GSP and ACP agreements, the trade flows enter the EU market under the ACP regime. Similarly, if a country benefits from GSP and RTA, then we assume that the imports enter the EU market under RTA. These choices are based on two arguments. The first refers to the fact that, for the five products considered in this paper, GSP tariffs are generally higher than the preferential tariffs established in favour of ACP and RTA countries. The second consideration is that RTA and ACP agreements involve RoO which are much less restrictive than those under GSP. Therefore, exporting countries will prefer not to use the GSP scheme even if the preferential margin is equal to that received with the Cotonou agreement or with a RTA. To be more precise, the GSP variable is the preferential margin granted by the EU to the imports of the s-*th* product from the developing countries eligible for GSP treatment only. In other words, the GSP variable regards a sample of countries net of LDCs and ACPs. Similarly, the ACP variable represents the margin of trade preference in favour of the group of countries net of LDCs which signed the Cotonou agreement. The RTA variable indicates the margin of preference granted in favour of developing countries which signed bilateral trade agreements with the EU.[10]

The procedure used to define the variables GSP, ACP and RTA leaves out the LDCs, which we split into two sub-samples on the basis of whether they are eligible or not for the Cotonou agreement. Furthermore, for each of these two groups of countries, we consider the

[10] The agreements included in the analysis are those with Albania, Algeria, Andorra, Bosnia Herzegovina, Bulgaria, Chile, Croatia, Cyprus, Czech Republic, Egypt, Estonia, Hungary, Iceland, Israel, Jordan, Latvia, Lebanon, Libya, Lithuania, Macedonia, Mexico, Morocco, Norway, Palestinian Authority, Poland, Romania, Serbia and Montenegro, Slovakia, Slovenia, South Africa, Switzerland , Syria, Tunisia, Turkey.

preferential treatment received before and after the implementation of EBA, i.e. before and after 2001. Thus, for instance, the variable $13LDC_{Not-ACP}^{pre-2001}$ in eq. [1] indicates the margin of preference enjoyed up to 2001 by the group of the 13LDCs which did not sign the Cotonou (see footnote 3). By extension, the meanings of $13LDC_{Not-ACP}^{post-2001}$, $36LDC_{ACP}^{pre-2001}$ and $36LDC_{ACP}^{post-2001}$ can be easily inferred.

Data on EU imports are from COMEXT.[11] Inward processing imports are subtracted from total imports in order to take into account imports entering the EU to be processed and re-exported merely to benefit from tariff exemption. The set of importing countries is comprised of the individual EU-15 member states,[12] while there are 191 exporters, i.e. all the countries for which trade statistics are available. As far as the explanatory variables are concerned, data on GDP and population are from the 2008 World Development Indicators. All data regarding values are in constant 2000 Euros. The preferential variables GSP, ACP, RTA and EBA are determined using the dataset DBTAR (Gallezot, 2005) for the period 2001-2004, while for the period 1995-2000 and the years 2005 and 2006, they are calculated by extracting the information needed from TARIC (http://ec.europa.eu/taxation_customs/dds/tarhome_en.htm).

With regards to the methods used to estimate equation [1], it is worth noticing that the results obtained from the estimation of a gravity equation suffer from three main potential sources of bias, which are related to country-pair heterogeneity, endogeneity and the presence of zero trade flows.

Heterogeneity may be due to observable and non-observable factors which are specific to each country-pair. From an econometric perspective, the omission of such factors leads to a

[11] The Comext dataset provides data expressed in CIF value. Thus, in order to transform data to FOB, we compute the CIF/FOB ratio and follow the IMF Direction of Trade Statistics (DOTS) procedure. For this calculation, data are from Comtrade. This source provides data at HS6 level, we assume that CIF/FOB ratios do not differ if we move from HS6 to HS8-digit commodity lines.

[12] In order to work on the same sample of importers over the entire period taken into consideration, we disregard the 2004 EU enlargement to 25 members. However, this fact should not introduce any bias in the estimations because, in the five sectors under scrutiny, LDC exports predominantly go to EU15, while those towards new EU members are extremely limited. Furthermore, this paper covers just two years (2005 and 2006) after the new memberships of 2004 and it is highly likely that EBA has had no effect on trade in such a short period of time.

mis-specification of the gravity equation, and could produce biased and/or inconsistent estimates. To control for country-pair individual effects, we have included in the gravity equation a set of commodity-country pair fixed effects (α_{ij}^{s}) derived from the following decomposition of the error term: $\varepsilon_{ijt}^{s} = \alpha_t + \alpha_{ij}^{s} + u_{ijt}^{s}$ (see eq. 1).

The endogeneity issue is related to the fact that PTA variables could be determined simultaneously with trade flows. In fact, it is not unanimously agreed whether countries trade more because they have a PTA or that they participate in a PTA because they already traded relatively more with each other than with other countries. Thus, we perform the Davidson-Mackinnon (DM) endogeneity test, which compares OLS and IV estimations in a panel framework.[13] As can be seen from table 3, the p-values of the DM test allow us to reject the hypothesis of endogeneity of the preferential variables in all estimations.

With regards zero trade flows, we take into account the arguments put forward by Santos Silva and Tenreyro (2006) according to which a multiplicative gravity specification is more appropriate than a log-linear one. These authors show that the log-linearisation of the gravity equation changes the "properties of the error term in a nontrivial way" (Santos Silva and Tenreyro, 2006: 644) because the error terms of the original multiplicative specification are heteroskedastic. This bias violates the statistical independence of the error term and the independent variables and leads to inconsistent estimates (see also Westerlund and Wilhelmsson 2006). Hence, Santos Silva and Tenreyro (2006) supported the choice of the multiplicative specification of the gravity model and employed a Poisson model. We use the negative binomial model with fixed effects instead, because the Poisson model assumes equal mean and variance of the dependent variable whereas the negative binomial model allows the likely over-dispersion in trade flow observations to be taken into account.

[13] In performing this test we consider just one preferential variable which includes all preferential schemes. To define this preferential variable, we address the issue of overlapping as follows: if a country benefits from GSP and EBA, the latter is the scheme considered. If a country benefits from GSP and ACP or GSP and RTA, then ACP and RTA are the agreements considered in the computation, respectively. The logarithm of aid received by the exporting country is the variable used to instrument the preferential variable. We verify that the endogenous variable is highly correlated with the instrument, even after sifting out the other exogenous variables in the equation, in order to meet the "order conditions" (Wooldridge, 2006).

4. Estimation Results

Table 3 presents the results obtained by estimating eq. [1] using the negative binomial estimator. As for the impact of population, it has been argued that larger countries trade more and, thus, the coefficients relating to population are expected to be positive. However, if an exporter is large in terms of population, it may need its production to satisfy domestic demand, so that it may tend to export less (Oguledo and Macphee, 1994). On the other hand, it may export more than a small country, as is the case when large firms achieve economies of scale. The same reasoning can be applied to the case of the importing country: if large, it may either import less because it is likely that the domestic sector finds it profitable to develop and make the country self-sufficient, or it may import more because it cannot satisfy all domestic demand with its own production (Pusterla, 2007). Even though these are very general considerations regarding the expected sign of the standard gravity variables, in our case we expect that the EU population will exert a positive effect on EU imports of the products under scrutiny. This is basically why EU production in these sectors is negligible, and thus domestic demand may be satisfied by imports alone. Indeed, we find, that the population of exporters has a positive impact on EU imports of vanilla beans, crustaceans and molluscs, while the population of EU importers always has a positive and significant effect on imports. The GDP pro capita of exporters has a positive effect on EU imports of coffee, vanilla beans and crustaceans, while the coefficient of importers' GDP per capita is positive in the case of cloves and vanilla beans.

The estimated impact of PTAs on EU imports varies across products. In particular, it is found that the ordinary GSP enhances the exports of vanilla beans, coffee and crustaceans from developing countries to the EU. The trade preferences enjoyed by ACPs are only effective in increasing EU imports of crustaceans, while RTAs have a positive effect on EU imports in every sector (the coefficient is always significant, with the exception of that estimated in the model explaining EU imports of vanilla beans).

The evidence regarding the effectiveness of EBA is provided by looking at the estimated coefficients of the variables $13LDC_{Not-ACP}^{post-2001}$ and $36LDC_{ACP}^{post-2001}$ and comparing them with those associated with the variables $13LDC_{Not-ACP}^{pre-2001}$ and $36LDC_{ACP}^{pre-2001}$. By referring to the

general arguments regarding the positive role of the preferential treatment in enhancing the exports of preferred countries, the sign of the parameters β_5 and β_7 is expected to be positive.

The study reveals that the impact of EBA is mixed. Let's proceed by pointing out that the variables $13LDC_{Not-ACP}^{pre-2001}$ and $36LDC_{ACP}^{post-2001}$ are dropped in three out of five regressions. This is because the $13LDC_{Not\text{-}ACP}$ did not export cloves, vanilla or coffee to the EU over the period analysed. Again, no robust result comes from the regression of molluscs. In this case the coefficient of $13LDC_{Not-ACP}^{pre-2001}$, namely β_4, is negative but not significant, while the parameter β_5 remains negative (-0.13) and smaller than β_4 after 2001. However, the economic interpretation of β_5 should be made with caution because of the 10% level of significance. As regards crustaceans, we find that the exports from the $13LDC_{Not\text{-}ACP}$ to the EU were positively affected by the preferential treatment granted by the EU. This holds both when these countries exported under the ordinary GSP up 2001 (the estimated value of β_4 is 0.06) and when they enjoyed free market access granted unilaterally by the EU through the EBA initiative (the estimated value of β_5 is 0.04). Thus, in the regression of crustaceans, as β_5 is positive we conclude that EBA positively affects the exports from $13LDC_{Not\text{-}ACP.}$

As far as the group of $36LDC_{ACP}$ is concerned, results displayed in table 3 indicate that the estimates obtained when explaining the exports of coffee and molluscs are not interpretable because of their low statistical significance, while a negative effect of EBA after 2001 has been found in the case of cloves. Encouraging evidence comes from the regressions of vanilla and crustaceans. It has been found that the trade preferences granted by the EU have been effective in increasing these exports, both before and since 2001. When analysing the exports of vanilla, it emerges that the estimated impact of ACP preferences is β_6=0.25 before 2001, i.e. when these $36LDC_{ACP}$ countries used the preferences under Cotonou,. The effect of trade preferences increases to β_7=0.41 when considering the years (2001-2006) of EBA application. All this suggests that the preferential treatment granted by the EU in favour of the $36LDC_{ACP}$ determines a substantial positive impact in increasing the exports of vanilla beans towards the EU market and that this impact increases with EBA. A similar positive impact of trade preferences emerges when considering the exports of crustaceans from $36LDC_{ACP}$ to the EU. In such a case, exports from the group of $36LDC_{ACP}$ expand, as a result, first for trade preferences during the years of application of Cotonou (β_6=0.05), and secondly when EBA comes into force (β_7=0.40).

The evidence shows how results differ from one sector to another. This, on the one hand, limits the possibility to draw a general conclusion about the role of EBA, but, on the other hand, supports the approach followed in this paper of conducting a study using data at product level. Indeed, in such a way, we gauge the sector specificities which, otherwise, using aggregated trade flows, would be hidden. In fact, results obtained in this paper differ from those found by Pishbahar and Huchet-Bourdon (2008) and Gradeva and Martinez-Zarzoso (2009). Pishbahar and Huchet-Bourdon (2008) show that the impact of EBA on EU agricultural imports is always negative when significant. This result is analogous to that provided by Gradeva and Martinez-Zarzoso (2009) when they analyse the effect of EBA on EU total imports from those LDCs belonging to the Cotonou agreement. On the other hand, our regressions yield results which, in some cases, do not match expectations, but, in others, do, as in the cases of vanilla and crustaceans. Broadly speaking, this is an unexpected outcome given that tariff gains due to EBA were not marginal for the $13LDC_{not\text{-}AC}$ group (see table 2 and figures 3-7). In a nutshell, EBA did not divert LDC trade from the rest of the world towards the EU, though $13LDC_{Not\text{-}ACP}$ got substantial tariff gains in the markets taken into consideration.

From an econometric perspective, the unexpected evidence obtained for the clove, coffee and mollusc sectors is due to the fact that the array of exports comprises scant observations regarding LDCs exports. In other words, the array of exports from LDCs is composed of a very limited number of positive values or, equivalently, of a massive number of zeros. This makes the estimation procedures very difficult. In brief, LDCs exports to the EU were driven by just a few countries which exported to a restricted number of individual EU importers for a limited number of years. By limiting the discussion to the 5-product case studied in this paper, it emerges that there was no radical change in the structure of trade relationships with the EU over the years of application of EBA.[14] We observe that no LDC country became a new

[14] For instance, no country in the $13LDC_{Not\text{-}ACP}$ group exported cloves, coffee and vanilla beans to the EU over the period under scrutiny, only one exported molluscs and, finally, only five exported crustaceans. The same applies when considering the $36LDC_{ACP}$. In this case there were just two exporters of cloves and vanilla beans and seven coffee exporting countries. Furthermore, these products were imported by a very restricted number of individual EU15 countries and the relative trade flows existed, at maximum, for four out of twelve years. As for molluscs, there were just seven $36LDC_{not\text{-}ACP}$ which exported to the EU, while crustaceans were exported to the EU by twenty five $36LDC_{not\text{-}ACP}$. Finally, Tanzania only exported vanilla beans to Belgium and, then, just for one year, 2000.

exporter to the EU, a fact that could be interpreted as a result, in these sectors, of the new initiative. In addition, LDCs' world market share in the five analysed sectors tended to diminish, something which may have been due to the role of emerging actors in the world market or/and to the likely tendency within each LDC country to divert production and exports towards other more remunerative sectors and/or countries. The understanding of these facts lies beyond the scope of this work, but it is likely that they may contribute to explain the weak effect of EBA revealed in some of our estimations.

5. Conclusions

This paper assesses the effectiveness of the EBA initiative on the LDC exports of cloves, vanilla beans, coffee, crustaceans and molluscs over the period 1995-2006. The sample of commodities is derived from a selection process based on three conditions concerning the overall export capacity of LDCs, the existence of an effective tariff gain for LDCs as a result of EBA and the absence of intra-year seasonality in tariff levels.

With respect to other literature dealing with this issue, the effectiveness of EBA in promoting an increase in LDCs exports, and using the same empirical framework, namely the gravity model, we introduce a few innovations. First of all, unlike the rest of the literature using the gravity model to explicitly evaluate the impact of EBA, this paper proposes a measure of preferential trade policies based on the preferential margin and not on dummies. Secondly, this paper presents an evaluation obtained by using data disaggregated at HS8 level in order to avoid aggregation bias in calculating an average measure of tariffs and with the aim of better identifying the key trade flow on which the preferential treatment is expected to have an impact. Thirdly, we control for country heterogeneity, endogeneity and zero-trade flows. Estimations were made using the negative binomial model.

Results, in some ways, contrast with those obtained in previous works which have unanimously found that EBA was not effective in increasing EU imports from LDCs. It should be noted that those papers consider total trade and not imports at commodity level. On the contrary, by using trade at a very high level of data disaggregation, we have shown that the EBA initiative exerts for some products a positive role in enhancing LDC exports to the EU. In particular, the exports of crustaceans and vanilla were positively affected by the

preferential treatment provided under EBA while no conclusion can be drawn when considering the exports of coffee, molluscs and cloves.

A limitation of this study is that it is based on a small number of products and, therefore, concerns arise regarding the possibility to generalise about the results. As a partial answer to this criticism, we stress that the main motivation for the work stems from the belief that preferential trade policies have to be evaluated by using disaggregated data and, hence, a selection of products is necessary. Evidently, the possibility of drawing general conclusions about the role of EBA is not to be expected from this study, but our aim is to provide robust sectoral evidence allowing us to argue whether or not EBA has stimulated exports from LDCs to the EU of a specific product.

Many factors contribute to the result regarding the partial effectiveness of the EBA initiative. For instance, we get an indication of the weak trade relationship between LDCs, as a group, and the EU by looking at the trade statistics used throughout this work. We find that there are very few LDCs actually exporting to the EU and this, from a technical point of view, is a source of the unsatisfactory estimations. This is because, whereas on one hand, EBA may have had a positive effect on an individual country, on the other hand, this effect might not be captured by a gravity equation, because the estimated parameters refer to the average impact of the EU policy in the entire set of LDCs. This is, of course, common to all regressions, whatever the specific focus, but in our case it is exacerbated by the massive presence of zeros in the array of exports from LDCs. If these arguments convince, then one possible direction for further research could be the addressing of the issues regarding the impact of EBA by carrying out country-case studies with details about the entire export structure in each economy.

From a more general point of view, the fact that only a few LDCs exported to the EU might be due to the weak supply capacity of LDCs, but it is also related to the existence of non-tariff barriers, such as transaction costs associated with RoO, administrative compliance costs and sanitary and phytosanitary standards which might reduce the effectiveness of preferential margins, especially for the smallest or poorest countries. In particular, as Bureau et al. (2007: 196) highlighted, the main motivation for the low utilisation of preferences is that DC are unable to “match the technical, sanitary, phytosanitary and traceability requirements imposed by developed countries, and, in particular, the private standards imposed by importers and retailers”. This is particularly true for LDCs which are often unable to satisfy the standards

required by the EU private retail sector. Therefore, one explanation for the partial effectiveness of EBA is that private standards impede LDCs exports to the EU market even though they enjoy tariff and quota free access. This means that the advantages relating to the preferential treatment are counterbalanced by the costs to satisfy private standards. Of course, time is a crucial dimension in making compliance with such standards less burdensome than now. Producers in LDCs, for instance, might meet standard requirements and gain technological spillovers from participating in large vertical retail supply chains rather than continuing to sell through traditional channels, such as wholesale markets. Another important feature to be considered in order to understand the results of this paper is that LDCs have possibly reacted slowly to the new trade regime introduced by EBA in 2001. For instance they may have taken time to invest in their sectors of specialisation in order to get the advantages to export towards the EU more than before. If these investments have been made, their desired effects will be observable only in the medium term. All this helps to understand why, as this paper documents for the five products under investigation, LDCs still export so little to the EU .

To conclude, our findings support the decision to work on a disaggregated basis and suggest that the right approach for further research is to focus on specific products. In this respect, robust evidence of the impact of EBA on LDCs exports is expected to be found when the analyses are made as country-case studies and when the medium and long term effects of adjustments by the LDCs, such as compliance to standards and investments in production, are fully revealed. In brief, the analysis suggests that issues which have not been dealt with in this study may help in the understanding of the role of EBA and, hence, deserve more attention in the near future.

Table 1 Export market shares of LDCs in the EU-27 market (1998-2007).

Groups of Products (2-digit)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
HS01 Live Animals	0.008	0.006	0.004	0.123	0.010	0.019	0.035	0.283	0.001	0.021
HS02 Meat and Edible Meat Offal	0.000	0.000	0.002	0.025	0.049	0.000	0.000	0.001	0.001	0.000
HS03 Fish, crustaceans, molluscs, acquatic invertebrates	0.134	0.401	2.118	2.368	2.697	3.290	3.000	2.443	2.381	2.603
HS04 Dairy Products, Eggs, Honey Edible Animal	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001
HS05 Products of Animal Origin	0.002	0.025	0.392	0.031	0.005	0.025	0.028	0.021	0.030	0.027
HS06 Live Trees, plants, bulbs, roots, cut flowers, etc.	0.002	0.010	0.006	0.009	0.006	0.030	0.033	0.233	0.441	0.849
HS07 Edible vegetables and certain roots and tubers	0.054	0.035	0.051	0.150	0.183	0.173	0.293	0.346	0.313	0.327
HS08 Edible fruit, nuts peel of citrus, melons	0.070	0.097	0.113	0.086	0.103	0.085	0.118	0.127	0.128	0.111
HS09 Coffee, tea, mate and spices	0.466	0.922	1.090	2.359	3.251	3.537	3.010	3.195	3.259	2.565
HS10 Cereals	0.011	0.006	0.005	0.014	0.012	0.013	0.026	0.036	0.032	0.025
HS11 Milling products, malt, starches, nulin wheat gluten	0.001	0.008	0.009	0.021	0.015	0.033	0.062	0.015	0.052	0.045
HS12 Oil seed, oleagic fruits, grain, seed, fruit, etc,	0.301	0.172	0.163	0.151	0.152	0.166	0.282	0.264	0.177	0.129
HS13 Lac, gums, resins, vegetable saps and extracts	0.347	0.467	0.410	0.962	0.775	0.667	0.467	0.430	0.530	0.583
HS14 Vegetables plaiting materials, vegetable products	0.726	0.512	0.345	1.913	2.554	3.309	3.236	2.799	2.331	2.093
HS15 Animal, Vegetables fats and oils, cleavage products, etc	0.502	0.260	0.951	0.965	0.565	0.337	0.228	0.167	0.064	0.193
HS16 Meat, fish and seafood food preparations	0.250	0.118	0.772	0.790	0.522	0.863	0.661	0.515	0.519	0.451
HS17 Sugars and sugar preparations	0.019	0.357	0.456	0.710	0.490	0.897	0.797	0.572	0.816	1.027
HS18 Cocoa and cocoa preparations	0.025	0.015	0.056	0.082	0.094	0.068	0.108	0.145	0.134	0.118
HS19 Cereal, flour, starch, milk preparations and products	0.001	0.001	0.001	0.003	0.009	0.005	0.009	0.019	0.029	0.041
HS20 Vegetable, fruit, nut etc food preparations	0.008	0.001	0.015	0.012	0.043	0.014	0.011	0.011	0.008	0.039
HS21 Miscellaneous edible prepariations	0.002	0.001	0.004	0.001	0.002	0.001	0.003	0.002	0.004	0.002
HS22 Beverages, spirits and vinegar	0.000	0.002	0.013	0.007	0.010	0.008	0.007	0.011	0.007	0.007
HS23 Residues, wastes of food industry, animal fodder	0.051	0.015	0.093	0.111	0.123	0.064	0.033	0.008	0.022	0.024
HS24 Tobacco and manufactured tobacco substitutes	0.014	1.132	1.032	0.914	0.906	0.922	0.777	0.913	1.646	1.817
HS29 Organic chemicals	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.000	0.000
HS35 Albuminoids, modified starches, glues, enzymes	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.001	0.001
HS41 Raw hides an skins and leather	0.038	0.055	0.061	0.755	1.233	0.874	1.089	1.138	1.286	1.331
HS50 Silk	0.001	1.564	3.425	0.005	0.013	0.005	0.005	0.002	0.010	0.010
HS53 Wool, animal hair, horsehair yarn and fabric thereof	0.098	0.224	0.098	0.228	4.067	2.572	2.834	3.216	3.270	4.149
Total Agricultural Exports (from HS01 to HS24)	0.089	0.160	0.353	0.421	0.421	0.469	0.418	0.408	0.442	0.444
Total Exports	0.038	0.050	0.083	0.105	0.196	0.196	0.225	0.199	0.170	0.184

Source: own computations on data from Comtrade (as it is on July 22, 2009).

Table 2 Selecting criteria of the products at HS-4 digit level.

Commodity	LDC world exports (% of world market)	GSP tariff	Seasonality?
Cloves (whole fruit, cloves and stems)	71.032%	positive	No
Vanilla beans	65.226%	positive	No
Ground-nut oil, fractions, not chemically modified	32.158%	equal to MFN (=0)	No
Copra	12.322%	equal to MFN (=0)	No
Live sheep and goats	8.772%	since 2002 GSP tariff was equal to 0	No
Coconuts, Brazil nuts and cashew nuts, fresh or dried	8.642%	equal to MFN (=0)	Yes
Lac, natural gums, resins, gum-resins and balsams	6.780%	equal to MFN (=0)	No
Peel of citrus fruit or melons	5.963%	positive	Yes
Oil seeds and oleaginous fruits nes	5.486%	equal to MFN (=0)	No
Crustaceans	5.024%	positive	No
Leguminous vegetables, fresh or chilled	4.709%	positive	Yes
Coffee, coffee husks and skins and coffee substitutes	4.335%	positive	No
Molluscs	4.049%	positive	No

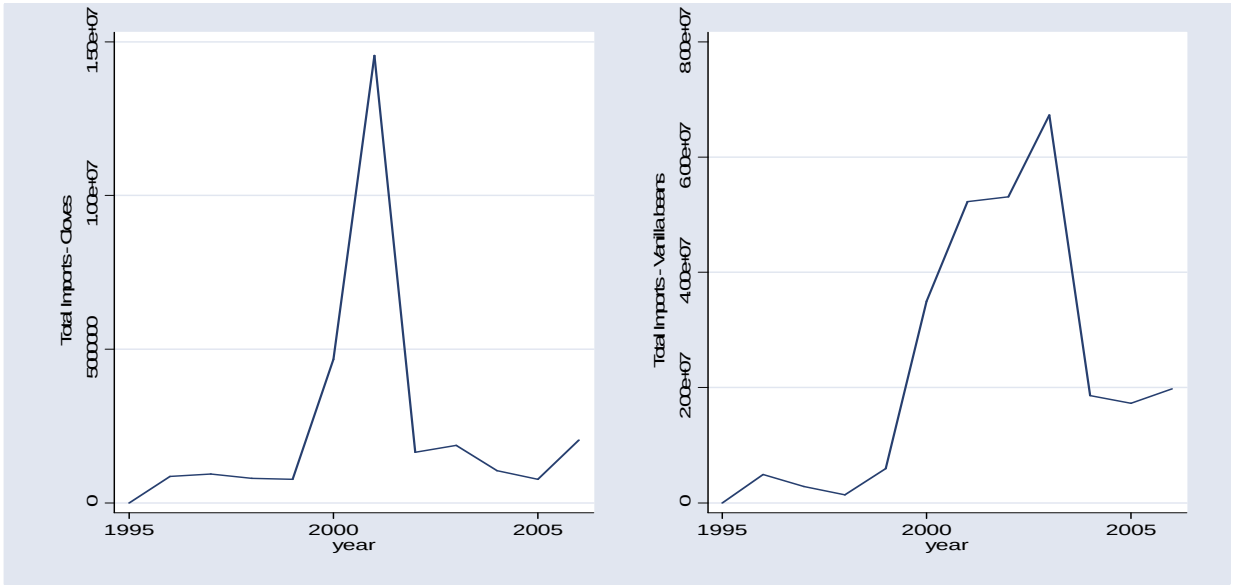
Source: own computations on data from Comtrade and Taric.

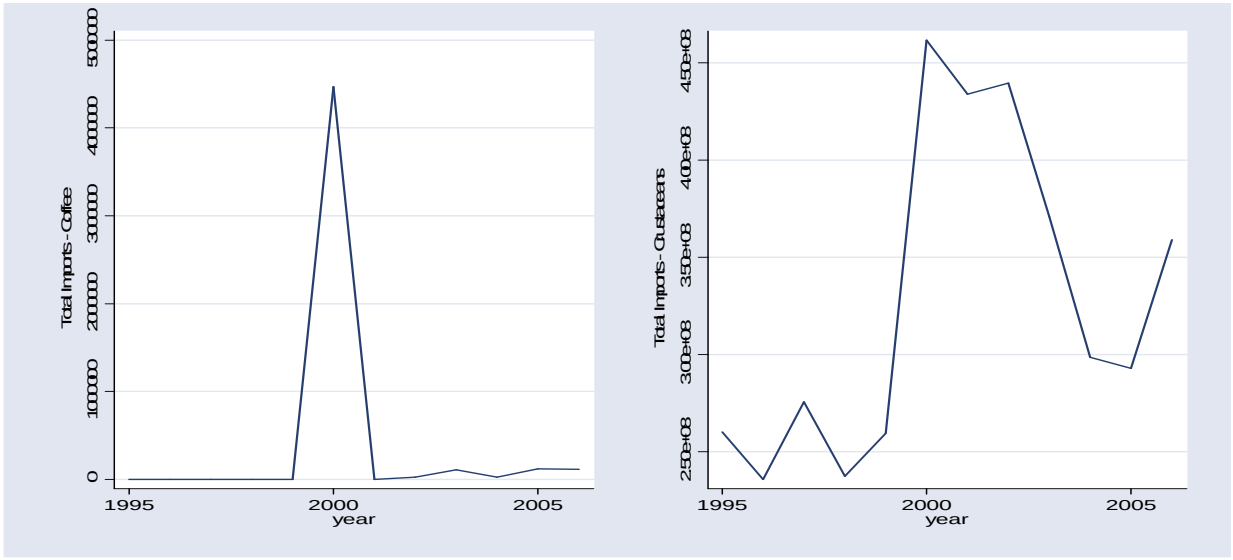
Table 3 Estimates of the multiplicative specification of the gravity model. Dependent Variable: imports in levels, 1995-2006.

	Cloves 0907			Vanilla beans 0905			Coffee, coffee husks and skins and coffee substitutes 0901			Crustaceans 0306			Molluscs 0307		
GSP_{only}	-0.2796	*(.08)*	***	0.1160	*(.05)*	**	0.0468	*(.02)*	**	0.0450	*(.)*	***	-0.0262	*(.01)*	***
ACP_{only}	-8.2794	*(422.79)*		-0.0279	*(.06)*		0.0484	*(.03)*		0.0451	*(.)*	***	-0.0573	*(.02)*	***
RTA	0.2821	*(.06)*	***	0.0340	*(.03)*		0.0301	*(.01)*	***	0.0398	*(.)*	***	0.0269	*(.01)*	***
$_{13}EBA^{pre-2001}_{not-ACP}$										0.0616	*(.01)*	***	-8.5996	*(1204.04)*	
$_{13}EBA^{post-2001}_{not-ACP}$										0.0366	*(.01)*	***	-0.1363	*(.07)*	*
$_{36}EBA^{pre-2001}_{ACP}$	-0.0879	*(.07)*		0.2506	*(.05)*	***				0.0516	*(.)*	***	-0.0150	*(.02)*	
$_{36}EBA^{post-2001}_{ACP}$	-0.1963	*(.08)*	**	0.4101	*(.07)*	***	-0.0572	*(.06)*		0.0396	*(.)*	***	0.0000	*(.01)*	
log(POP_exporter)	-0.142	*(.06)*	**	0.180	*(.05)*	***	-0.120	*(.03)*	***	0.027	*(.01)*	***	0.037	*(.01)*	***
log(POP_importer)	0.507	*(.09)*	***	0.511	*(.08)*	***	0.205	*(.04)*	***	0.192	*(.01)*	***	0.156	*(.02)*	***
log(GDP/POP_exporter)	-0.808	*(.14)*	***	0.262	*(.08)*	***	0.454	*(.03)*	***	0.072	*(.01)*	***	-0.041	*(.01)*	***
log(GDP/POP_importer)	1.374	*(.31)*	***	1.453	*(.3)*	***	-0.151	*(.12)*		-0.100	*(.03)*	***	-0.004	*(.05)*	
MTR_importer	-1.218	*(.38)*	***	-2.686	*(.45)*	***	-0.254	*(.15)*		0.195	*(.04)*	***	0.141	*(.07)*	**
MTR_exporter	83.330	*(15.62)*	***	6.084	*(7.33)*		7.920	*(1.43)*	***	8.561	*(.38)*	***	8.854	*(.55)*	***
Trend	0.191	*(.02)*	***	0.180	*(.02)*	***	0.159	*(.01)*	***	0.008	*(.)*	***	0.161	*(.)*	***
Costant	-30.158	*(4.25)*	***	-33.673	*(3.87)*	***	-325.611	*(16.87)*	***	-8.268	*(.37)*	***	-9.082	*(.57)*	***
Observations	1056			1350			4877			60432			26322		
Wald Chi-square	297.5			266.44			757.54			1752.44			2718.18		
Log-Likelihood	-3549.0056			-4433.5239			-15643.176			-195601.09			-88998.935		
Davidson-MacKinnon test of exogeneity	0.5026			0.2125			1.4988	0.5026		0.1621			2.8904		
p-value	0.4791			0.6454			0.2214	0.4791		0.6872			0.0892		

Note: all regressions include yearly dummies; standard errors in parenthesis (robust to heteroskedasticity). (*), (**), (***) denote statistical significance at the 10%, 5% and 1% levels, respectively.

Figure 1 EU imports from LDCs of the five selected HS4-digit agricultural products analysed (1995-2006). Data (in thousand Euro) are expressed at 2000 constant prices.





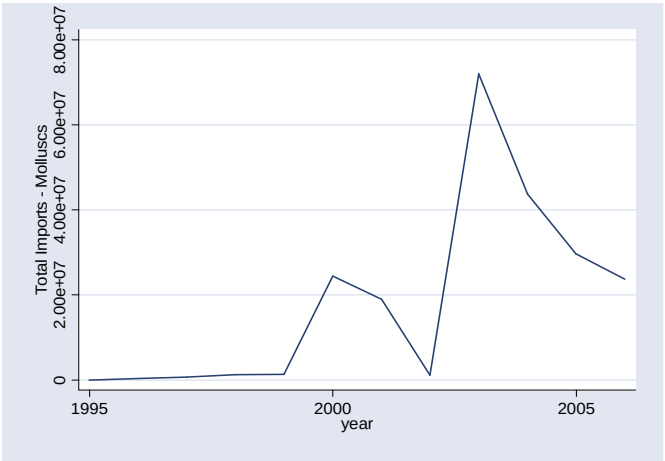
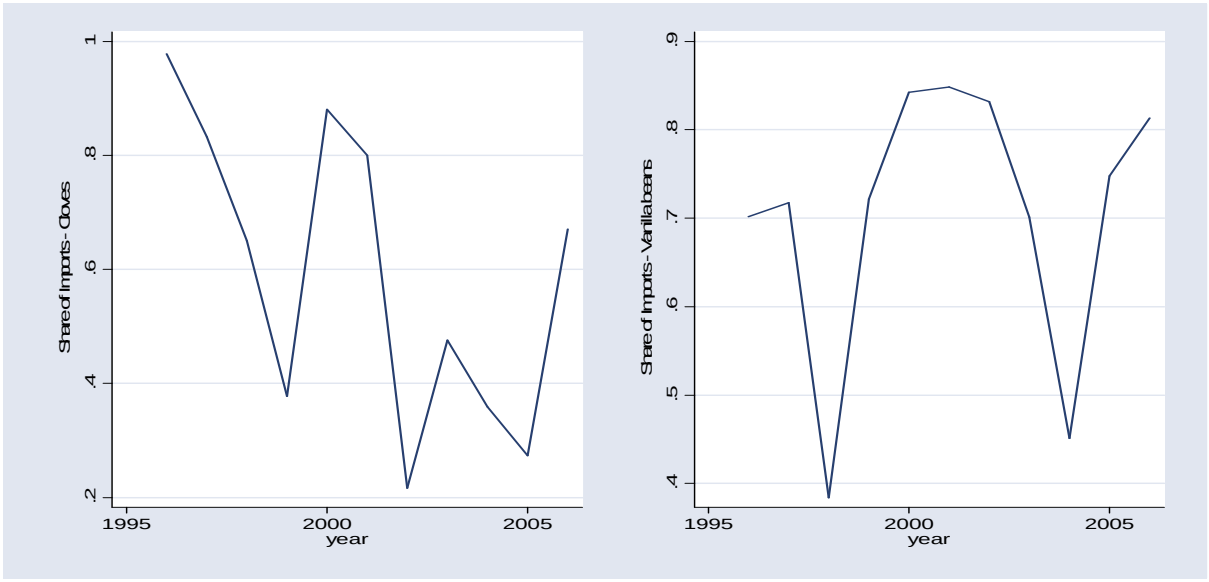
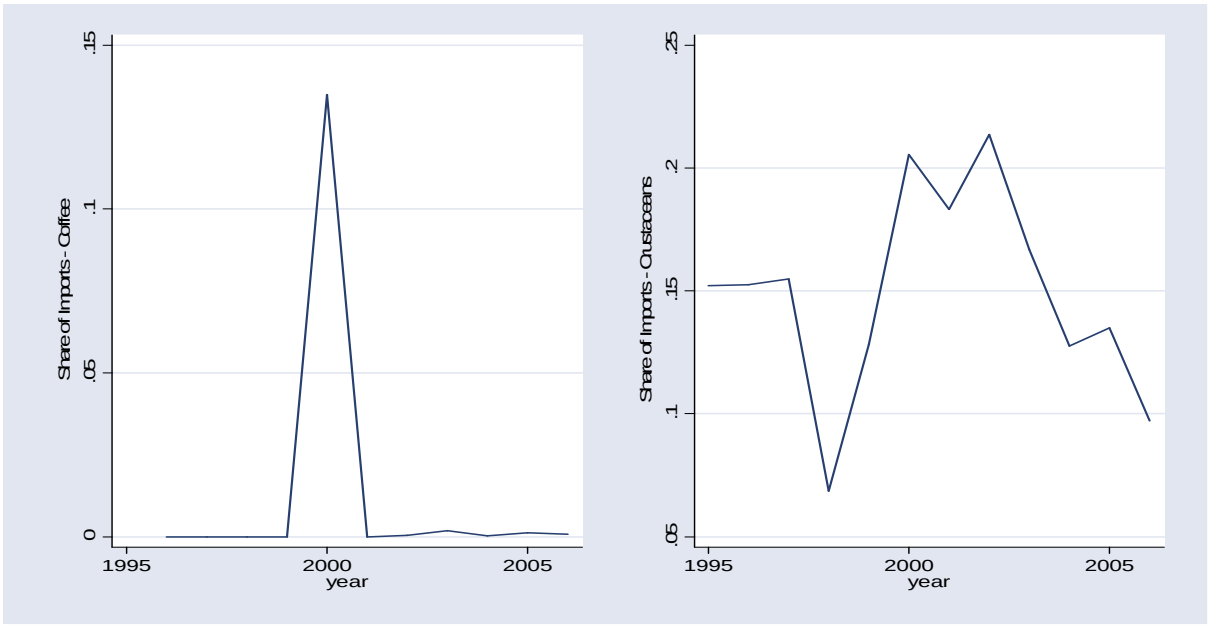


Figure 2 Shares (in percentage) of LDCs in the EU market for the five selected HS4-digit agricultural products analysed (1995-2006).





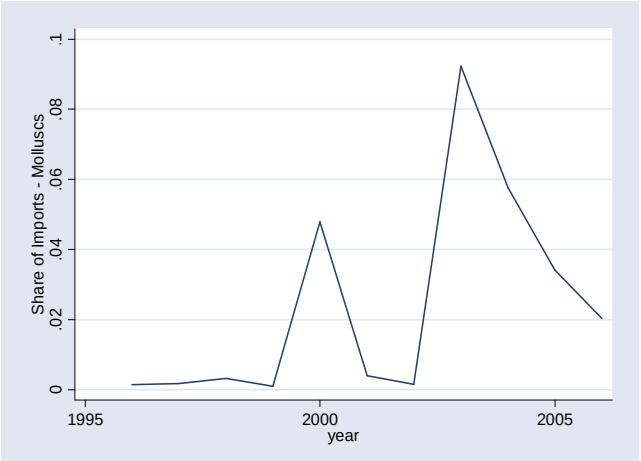


Figure 3 Tariff profile for EU imports of Cloves by PTA, 1995-2006.

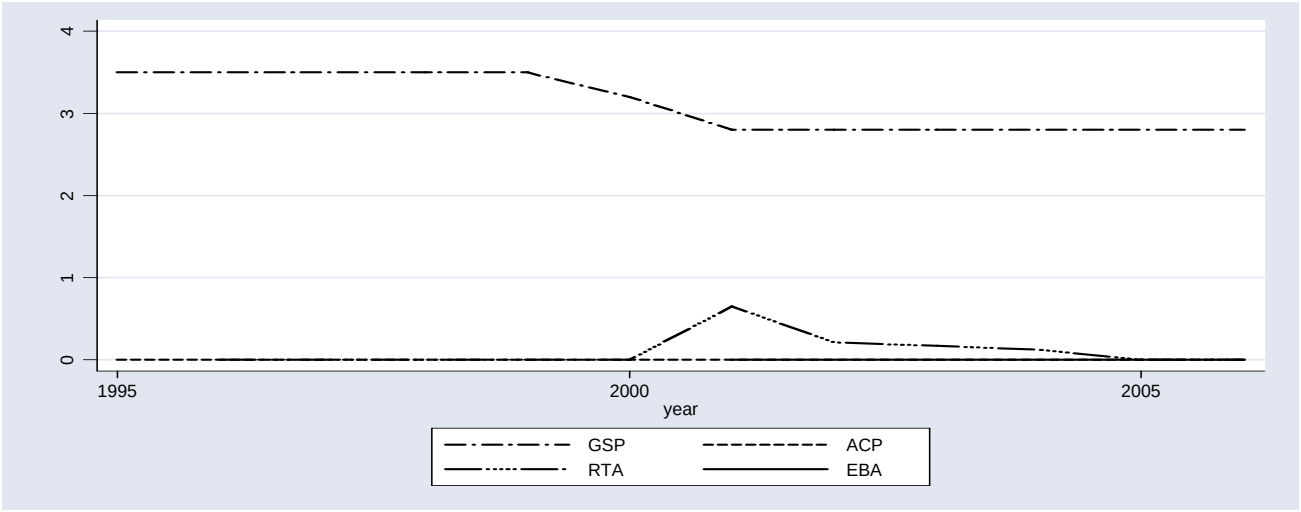


Figure 4 Tariff profile for EU imports of Vanilla beans by PTA, 1995-2006.

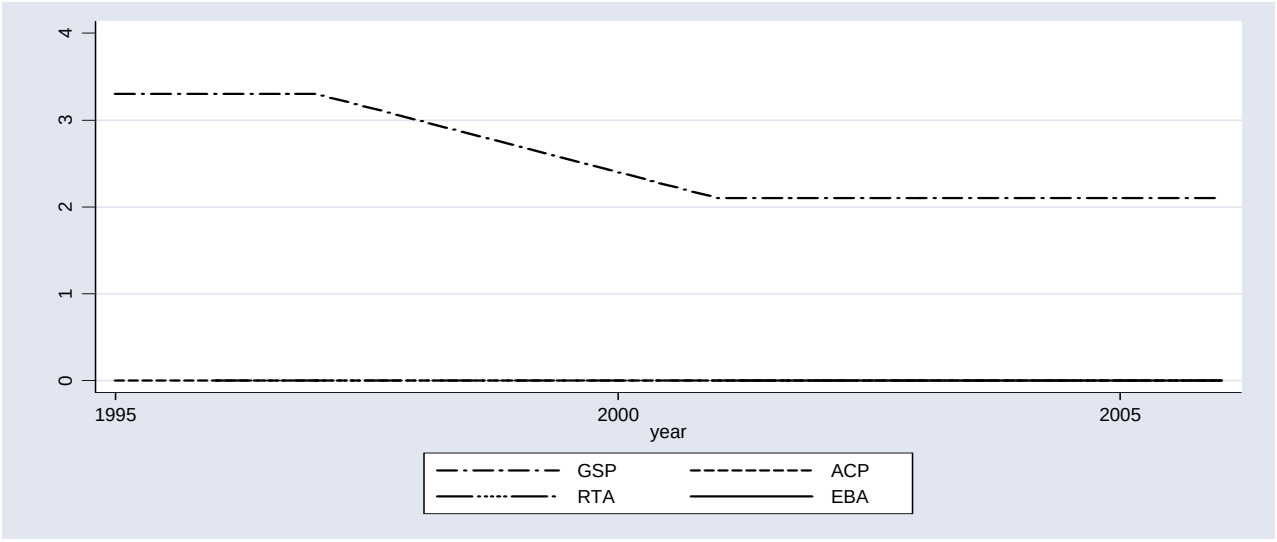


Figure 5 Tariff profile for EU imports of Coffee by PTA, 1995-2006.

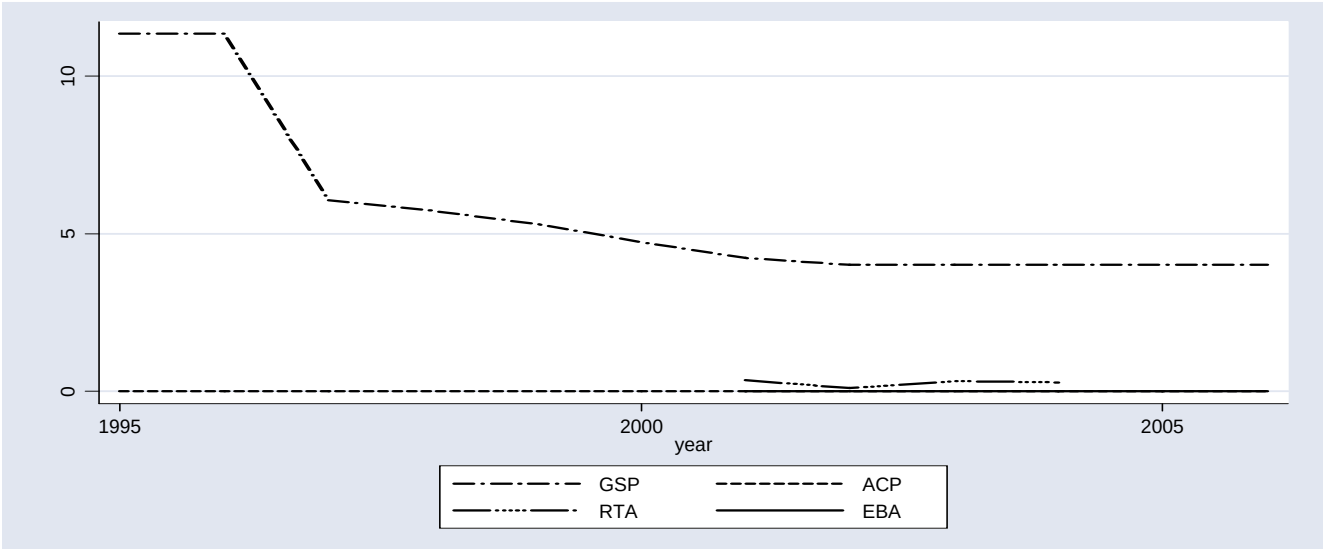


Figure 6 Tariff profile for EU imports of Crustaceans by PTA, 1995-2006.

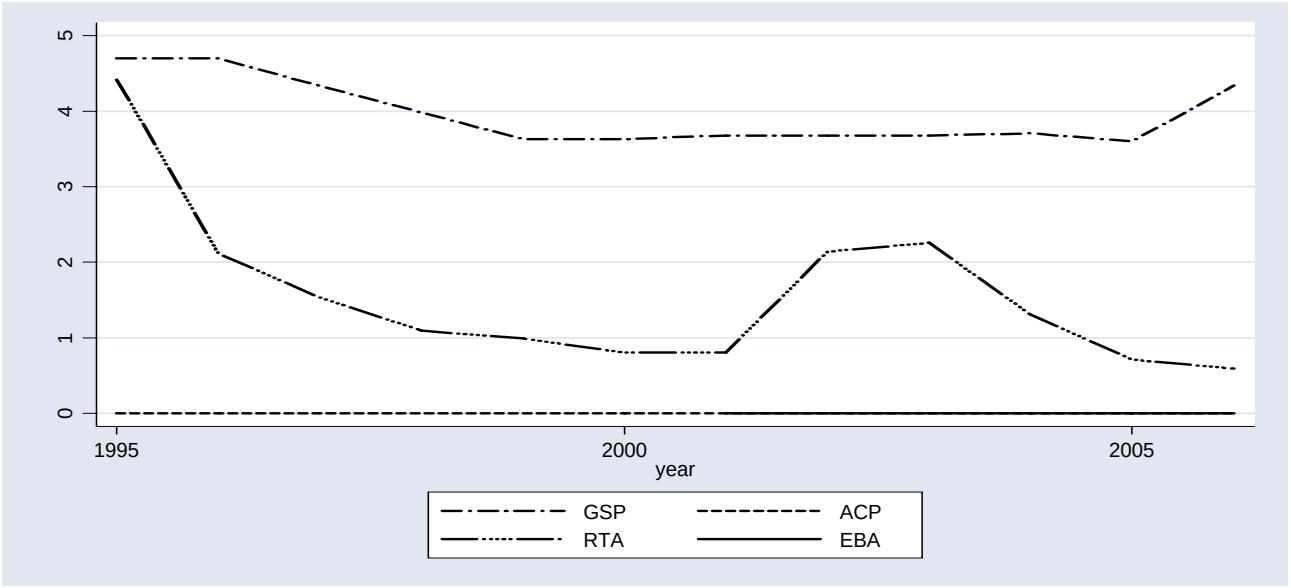
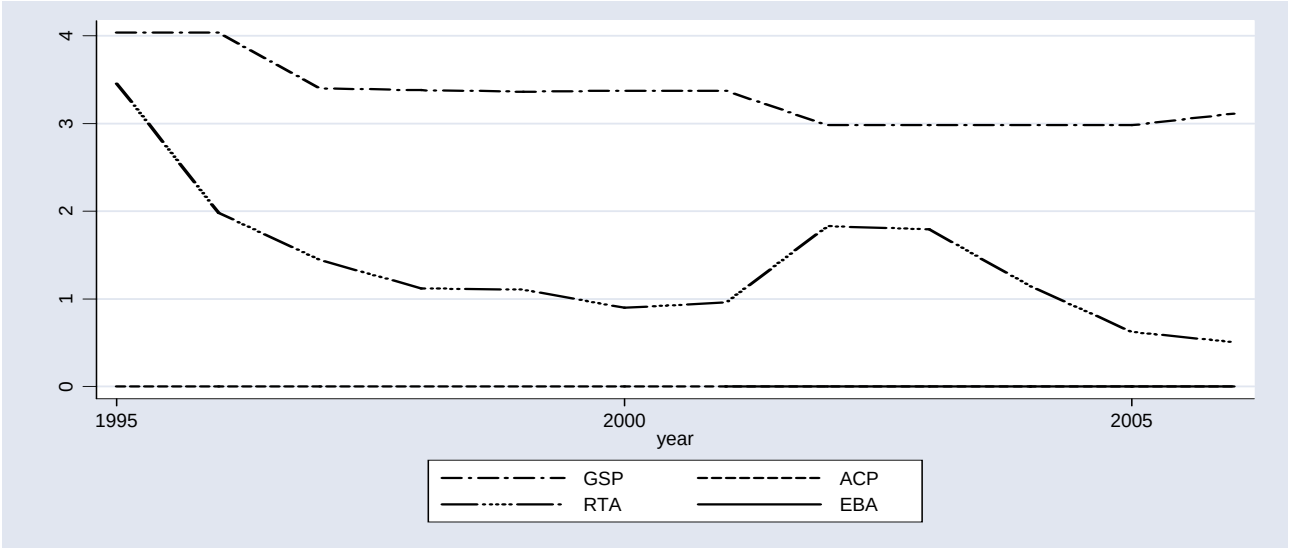


Figure 7 Tariff profile for EU imports of Molluscs by PTA, 1995-2006.



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