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Elisa Gamberoni

Graduate Institute of International Studies

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Key Words: Extensive margin, Melitz model, Generalized System of Preference.

JEL Classification: F12, F13, O19

* HEI Graduate Institute of International Studies, 132 Rue de Lausanne, CH-1211 Geneva. E-mail: gambero4@hei.unige.ch. I am really grateful to Richard Baldwin, Theresa Carpenter and all the NCCR Trade (IP 3) team for the helpful suggestions and valuable guidance.

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1 Introduction

Special and Differential Treatment (SDT) represents an important and controversial tool of the WTO's approach to development. Developing countries regard SDT as an instrument for expanding their export capacities and for taking part in the multilateral trading system, avoiding costs not compatible with their development needs.

An important dimension of SDT is represented by unilateral trade preference schemes. Developed countries offer these preferences to developing countries in order to ensure a better access to their market without asking in exchange a reciprocal treatment. The aim of these preferences is to help developing economies to expand their production capacity by offering them bigger potential markets for their products.

The traditional unilateral trade preference program is the Generalized System of Preference (GSP), which was introduced in the '70s. In subsequent years, several additional schemes have been added. These schemes are granted to different groups of countries, cover different products and offer different types of access. The European Union, for instance, offers not only the GSP, but also the GSP regime for Least Developed Countries; the regime to combat drug production; and, the Lomè regime for the African Caribbean and Pacific Countries (ACP). The latter is soon to be replaced by the bilateral trade agreements as foreseen by the Cotonou Convention.

The impact of these unilateral trade preferences has been the subject of numerous studies but mixed results have lead authors either to criticize the effectiveness of these programs or to even raise the possibility of negative effects. Even in cases where schemes offer preferences for a wide range of products, rules of origin (ROO) and administrative requirements seem to have prevented exporters from asking preferential access (Brenton 2003, Inama 2004). Moreover, the absence of stability in the unilateral preference schemes, which are not binding but are subject to frequent revisions, appears to have discouraged long term investments (Kennan, Stevens 2000).

Furthermore, preferences are seen as potentially harmful as they can either create an incentive to specialize in the product under preferential access or they can prevent the beneficiary countries from adopting more liberal trade policies. As pointed out by Mold (2005), criticism of unilateral trade preferences are based on the argument that "preferences might actually reduce the incentives to diversify: by increasing the potential rents from traditional exports, (...) preferences could contribute to 'locking in' developing countries even more decisively into existing productive structures". If this is the case, then preference erosion due to general tariff cuts could exacerbate the situation by leading to trade diversion as competition from other developing countries increases.

The existing literature has focused mostly on the calculation of indicators such as utility and utilization ratio; and on gravity equation in order to estimate the impact of unilateral trade preferences on the volume of trade. Additionally, simulations have analyzed the effect of trade diversion/creation. Results are rather inconclusive and do not offer a clear picture. As pointed out by Hoekman and Ozden (2005) “most studies have severe shortcomings as they fail to take into account that (a) preference rules are often determined at the very disaggregated product level, (b) the elasticity estimates at this level of aggregation are generally absent, and (c) finding the right controls to include in regressions are difficult.” (Hoekman et al., 2005, p.13).

This paper adds to the literature by trying to assess empirically the effect of the European unilateral trade preferences not only on the intensive margin but also on the extensive margin of trade. In doing so we exploit the prediction of the Melitz (2002) model and the estimation technique employed in different empirical investigations of the intensive and extensive margin of trade (Amurgo-Pacheco 2006, Baldwin, Di Nino 2005). In particular, we try to answer to two questions. The first is the classical question regarding the impact of unilateral trade preference on the volume of trade. Our contribution in this field is more technical in nature as we analyze this aspect by exploiting a detailed database at the six digit level of the Harmonized System Classification and using the appropriate estimation technique. Our second question, the impact of European unilateral trade preference on the extensive margin of trade, represents the real innovation of this paper. By extensive margin of trade, we mean the appearance and disappearance of exported products. This paper investigates whether unilateral trade preferences have increased the range of exported products from the beneficiary countries to the EU. We exploit the changes, in the products covered by these schemes and the switches from zeros to positive trade flows, over the years and across countries, to carry out the analysis. By answering this question we seek to identify whether unilateral trade preferences help a country in the diversification process or rather lead a country to be locked into existing structures. Our results suggest that anti-diversification effects are present in the case of ACP preferences while a low but positive effect is found in the case of the traditional GSP scheme. These results hold irrespective of whether we consider that a country is part of different regimes or whether we consider the best regime available to a country. In the case of preference for least developing countries results vary instead according to how preferences for a country are defined. In particular, when we consider only the best regime available to a country, preferences for LDC not covered by the ACP preferences seem to not have impacted on the exports from these countries. Finally, we find positive effects on both the extensive and intensive margin of trade in the case of agricultural products. This suggests the potential role of the preferences in the case of more protected sectors but also the possibility of a concentration of resources in this sector in the case of long standing preferences.

The paper is divided in four sections. In section two we revise the literature

more closely related to our investigation and we discuss the main features of the European unilateral preference schemes, which constitute the unilateral trade regimes under investigation. In section three we present the main features and predictions of the Melitz model which form the basis of our empirical investigation and we discuss the estimation technique employed in the empirical analysis. In section four we present and discuss our results while section five concludes.

2 Literature review

Earlier research that is closely related to our analysis has focused on two types of investigations: the type of market access offered by the different unilateral trade programs, and impact of these schemes on the volume of trade.¹

The type of market access granted by unilateral trade preferences is usually proxied with calculations of product coverage, utility ratio and utilization ratio. Utility ratios are calculated as the value of imports receiving preferences divided by total dutiable imports while utilization ratios are calculated as the value of imports receiving preferences divided by the value of the imports eligible for the preferences. For instance, the European Union's Everything but Arms (EBA) initiative provides high product coverage, reflecting thus that the European Union offers LDC preferential access in a wide range of products. On the other hand, Brenton (2003) using data for 2001, shows that the utilization rate is rather low, suggesting that the presence of non tariff barriers, strict rules of origin and administrative costs have prevented exporters from asking preferential access.

Candau and Jean (2006) show that when utilization rates are calculated on the best regime available to an exporter, utilization rates are not as low as commonly perceived. In particular, they show that utilization is high for Sub-Saharan Africa, due to the Cotonou scheme, and high in general in the case of agricultural products. Underutilization can instead be found only in the case of non-African LDCs in textile and clothing, and for non-LDCs only eligible for GSP for the textile-, the clothing- and manufacturing sector.

Additionally, they show that the extent of utilization can be linked to the preference margin available. The higher is the preference margin, the higher is the utilization rate.

Manchin (2006), using a threshold technique and a Heckman sample selection model, estimates whether there is a threshold in the duty offered by the Lomé agreement under which non LDC ACP countries have no incentives to ask preferences. The investigation covers the year 2001 and data are disaggregated at the eight digit level. Her results indicate that preferential access is asked if the difference between the offered duty and the MFN tariff is around 4%. According

¹An excellent overview of different results based on gravity regressions is offered by Hoekman and Özden (2005).

to Manchin the presence of a threshold would thus be a quantitative measure for the cost of requesting preferential access. Using the results from the threshold technique she thus estimates what determines the probability that preferential access is requested. Her results show that the probability of requesting access is linked to the sector, in particular the probability that ACP no LDCs request access is higher for the agricultural, textile and clothing sector while is lower for machinery and minerals.

Another branch of research has focused on the impact of unilateral trade preferences on the volume of export. Research is carried out using a gravity regression and a dummy variable that takes the value of one if the import country grants unilateral trade preference to the exporting country in the period taken into consideration. Results based on these estimations do not offer a clear-cut picture. Rose (2004), using a gravity model of total trade, finds that having the GSP is associated with an approximate doubling of trade.

Lederman and Özden (2004) analyze the impact of USA's unilateral preferences. Their analysis is based on the value of USA imports from developing countries at the two digit harmonized system (HS) in 1997 and 2002. They thus implement a cross-section Tobit analysis on the two years separately and find that GSP has a negative effect and being part of a Free Trade Area (FTA) has a positive impact. Regarding other unilateral preference programs, the results depend on how the schemes are proxied in the estimation.

Concerning the European unilateral preference programs, Nilsson (2002) estimates separate cross-section gravity equations for the period 1973-1992 and he finds a positive effect of the European GSP scheme and the ACP preference on the value of European countries' imports. Interestingly, the positive impact is present at the beginning and at the end of the sample period.

Looking at the set of Lomé preferences, the European Union was disappointed by these preferences. The Green Paper on relations between the European Union and the ACP countries on the eve of the 21st century looking at the impact of the trade preference granted under Lomé states that "as regards impact, in general the Lomé trade preferences have not been sufficient to enhance export growth and increase diversification.(...) Neither have they managed to diversify exports significantly and most still rely on a few primary products"²

In contrast from the previous approaches, we will look at the impact of unilateral trade preferences not only on the intensive margin of trade, that is on the volume of trade, but also in the quasi-extensive margin of trade, that is on the range of the varieties exported. In doing so, our analysis will be based on recent developments in trade theory (Melitz 2002) and econometric estimation of the gravity equation (Baldwin and Di Nino 2005, Amurgo Pachego 2006).

Using these new developments and a detailed database at the six digit level of the Harmonized System Classification, we analyze the impact of the unilateral trade preferences granted by the European Economic Community (EEC). Thus, the question that we try to answer is not only whether the preferential access

²European Commission, Directorate General VIII/1 "Green paper on relations between the European Union and the ACP countries on the eve of the 21st century-Challenges and options for a new partnership", 1996

granted by these schemes has increase the volume of exports of the developing countries to the EEC but also whether the preferential access has led developing countries to increase the range of their traded products. Answering this question implies looking at the effect of preferential access on the diversification of exports and thus the increase in productive capacities which is the ultimate goal of this trade policy.

The European preference schemes

We consider in particular four unilateral preference programs: the traditional GSP, the GSP for Least Developing Countries, the regime to combat drug production and the Lomè IV trade scheme.

During the period 1990-2004, the first three schemes were subject to three major revisions. Until 1999 we have two sets of council regulations that regulate agricultural products and industrial/textile products separately. The first revision of the full schemes took place in 1995 for textile and industrial products, when all quantitative limitations were abolished leading to the establishment of tariff modulation for all the products covered, in 1997 for the agricultural products, in 1999 and in 2002 for all the products that are part of the unilateral system of preferences.³

Every council regulation brings country/sector graduation; and changes in the products and in the numbers of countries covered. Except for the country/sector graduation the same applies also to the regime to combat drug production and to the GSP designated to LDCs. Concerning this last set of preferences, two main additional changes are worth mentioning: in 1998 preferences equivalent to the ACP countries were also granted to least developing countries while in 2001 the Everything but Arms (EBA) initiative began.

All three regimes involve that the EU grants unilateral trade preferences to developing countries, which are notified to the WTO under the enabling clause. However, differences emerge along four dimensions: product covered, access granted, ROO and contractual versus pure concessionary nature of the benefit.

The literature that focuses on the difference among these schemes recognizes, among others, three factors which help a regime in succeeding: the type of market access granted (duty free access rather than tariff reduction), the ROO applied (diagonal cumulation rather than product fully obtained), and the nature of the preference (stability rather than instability).

The following table shows how these factors apply to the four regimes being considered:

<i>Table 1</i>	GSP	GSP for LDC	Reg. comb.drug	ACP
duty free access		X	X	X
diagonal cumulation			X	X
stability of access		X with EBA		X

³For 1994 the preferences are designed using Council Regulation 3833/90, which concerns Agricultural product, 3832/90, which concern textile products, 3831/90, which concerns Industrial Products and the set of Council Regulations which lead to subsequent modifications.

The traditional GSP is usually considered the least favorable scheme. The scheme involves a tariff modulation mechanism according to product sensitivity. From 1995 products covered by the scheme can be classified as sensitive or non sensitive products. In terms of rules of origin requirements, for a product to be considered eligible, it must be either wholly obtained in the country that asks preference or it must have undergone sufficient working processes.

The GSP for the least developed countries differ from the traditional GSP in terms of products covered and access granted, i.e. products covered enjoy duty free access, but rules of origin are the same as applied to the traditional GSP framework.

The 1998 reform which granted least developed countries the same access enjoyed by ACP countries and the subsequent EBA initiative, have expanded the range of products which can enter duty free. In particular the EBA initiative as the name states has granted duty free access for all products except chapter 93 "Arms and ammunition". The exception are rice and sugar, which will only enjoy duty free access from the end of 2009, but meanwhile are still subject to tariffs, albeit reduced since July 2006. Graduation rules do not apply to these countries. Additionally, the EBA initiative has the characteristic of being a permanent scheme, not subject to periodic revisions.

The regime to combat drug production includes a great part of the products covered by the GSP but the market access granted is more favorable than traditional GSP since products covered enter duty free and regional cumulation is possible.

The Lomè Agreement is often cited as the most favorable regime in terms of access, products covered and rules of origin (diagonal cumulation is possible). An important difference between the Lomè regime and the other unilateral preference schemes, with the exception of the EBA initiative, lies in the permanent nature of the Lomè agreement versus a unilateral and temporary concession as represented by the GSP.

3 The model and the empirical strategy

Since we want to investigate the impact of the European unilateral trade preference programs not only on the intensive margin of trade but also on the extensive margin of trade we make use of the implications of the Melitz model. We provide a short outline of the model, which rather than being exhaustive, highlights the needed features for the empirical strategy⁴.

⁴Demidova, Looi Kee and Krishna (2005) develop a heterogeneous firm model that takes into account the presence of Rules of Origin. The aim of their Paper is to study the effects of different trade policies in the composition of productivities. By exploiting the different regimes that apply to a set of Bangladesh garment exporter, they constructed firm level total factor productivity to test the predictions of the model. As the objective of our investigation differs, we prefer to use a more general formulation of the Melitz model that allows us to deal with unilateral preference using a dummy variable.

In the Melitz model the range of firms that produce and sell in the domestic and foreign markets is endogenously determined and is related to the firm's marginal cost.

Assuming CES preferences, the households' demand for each individual good, either produced domestically or imported, is defined as $c_i = \frac{p_i^{-\theta}}{P_i^{1-\theta}} E$ where E represents the total expenditure of the typical consumer in country i , σ is the elasticity of substitution across goods and assumed to be greater than one, p_i denotes the price of a good in country i and $P_i = \left(\int^n p_i^{1-\sigma} dn \right)^{1/1-\sigma}$ is the CES Price Index where summation is taken over all goods consumed in country i .

There is a continuum of firms in each economy. In order to enter the market, a firm from country i must pay a fixed cost, which is considered sunk. The entry decision is based on the comparison between the discounted value of the expected stream of profits and the fixed entry cost. If the former is greater than the latter, a firm pays the fixed entry cost and draws a labour-per-unit-output coefficient a from a cumulative distribution function $G(a)$. Hence, firms are heterogeneous as they produce with different labour-per-unit output coefficient a . Productivity differences across firms translate into differences in the unit cost of production. Upon observing the draw, a firm may decide to exit and not to produce. If the firm produces, it faces a constant probability δ in every period of encountering a bad shock that forces it to exit. Also, if the firm chooses to produce, it bears additional fixed costs F_o , where o stands for origin. There are no other fixed costs when the firm sells only in the home country. If the firm chooses additionally to export to the foreign market, it bears also a fixed cost F_x^d and a melting-iceberg trade cost τ_{od} , where the subscript x denotes export costs and the superscript d denotes the destination market. Profit maximization from domestic and export sales lead firms to set prices as a markup over marginal costs. The price of domestic sales for a firm j in country o equals $p_o = \left(\frac{\sigma}{1-\sigma} \right) a$ while the price for the export market d equals $p_d = \left(\frac{\sigma}{1-\sigma} \right) \tau_{od} a$

Using this information and the derivation of the CES demand, operating profits of a firm in market o from domestic sales are:

$$\Pi_o = \left[\left(\frac{\sigma}{1-\sigma} \right) \frac{a}{P_o} \right]^{1-\sigma} \frac{E_o}{\sigma} - F_o \quad (1)$$

and from export sales are:

$$\Pi_{od} = \left[\left(\frac{\sigma}{1-\sigma} \right) \frac{\tau_{od} a}{P_d^{1-\sigma}} \right]^{1-\theta} \frac{E_o}{\sigma} - F_x^d \quad (2)$$

According to this model, a firm decides whether to enter and how much to sell in a market, comprised its own market, if its marginal cost is low enough to ensure non negative profits.

Firstly, a firm will sell in its own market only if its marginal cost is low enough to ensure at least zero profit. In the contrary case, a firm will exit the market. Setting (1) equals to zero and re-arranging terms, the cut-off condition that defines the threshold to produce domestically is given by:

$$\left(\frac{\bar{a}_{oo}}{1 - 1/\sigma} \right)^{1-\sigma} \frac{B_o}{\sigma} = F_o \quad (3)$$

where \bar{a}_{oo} is the threshold marginal cost for local sales in nation o , B_o is the demand shifter in nation o and equals $E_o/P_o^{1-\sigma}$, that is total expenditure of nation o on all varieties divided by the CES price index.

Not all the firms that produce for the domestic market are able to sell also in the foreign market.

Among all the domestic firms only the most productive will export. Setting (2) equal to zero, the marginal cost threshold for exporting to nation d market is:

$$\left(\frac{\bar{a}_{od}\tau}{1 - 1/\sigma} \right)^{1-\sigma} \frac{B_d}{\sigma} = F_d^x \quad (4)$$

where \bar{a}_{od} represents the threshold for exporting to market d and B_d is the demand shifter of nation d .

Firms divide themselves into three categories according to their marginal cost. Firms that have a marginal cost higher than \bar{a}_{oo} do not produce and exit the market, firms with marginal cost between \bar{a}_{oo} and \bar{a}_{od} serve only the domestic market while firms that have a marginal cost lower or equal to \bar{a}_{od} also export to the foreign market.

Based on these conditions, we can see that the decision of the firms to export to the foreign market is associated with the presence/absence of trade flow between nation- o and nation- d .

Thus, there is a one to one relationship between the decision of the firms to export to the nation- d market and the presence of trade flow between nation- o and nation- d .

In particular, the value of sales of a firm from nation o in nation d is defined by

$$vod = \begin{cases} \left(\frac{a\tau_{od}}{1-1/\sigma} \right)^{1-\sigma} B_d, & a \leq \bar{a}_{od} \\ 0, & a > \bar{a}_{od} \end{cases} \quad (5)$$

And thus summing over all export sales, the total imports of nation d from nation o is defined as:

$$V_{od} = \begin{cases} \tau_{od}^{1-\sigma} B_d \left(n_o \int_0^{\bar{a}_{od}} a^{1-\sigma} dG[a | \bar{a}_{oo}] \right) \left(1 - \frac{1}{\sigma} \right)^{\sigma-1}, & a \leq \bar{a}_{od} \\ 0, & a > \bar{a}_{od} \end{cases} \quad (6)$$

Where the cumulative distribution function G is cut at \bar{a}_{oo} since firms export conditional on being able to produce.

The model provides thus an explanation for the change of trade along the extensive margin, which represents the number of products exported, and the intensive margin, which represents the volume of trade. Changes in the export cut-off condition for a product leads to changes along the extensive margin while changes on the average value of export sales lead to changes along the intensive margin.

Unilateral preferences could reduce the variable cost τ_{od} through the granting of a lower duty. Alternatively, the cost associated with the request of preferential access, such as administrative costs, ROO and non tariff barriers produce the opposite effect. These costs increase the variable trade cost and the fixed cost to export. Thus a firm takes advantage of the preferential access only under the condition that the positive effect prevails.

The effect of a reduction in τ_{od} impacts along the two dimensions: new firms, which previously could not export due to the higher variable cost, start to sell also in the foreign market and previous exporters increase the amount of sales. Changes in the fixed cost, F_d^x , impacts instead only on the extensive margin of trade but not on the amount of sales of firms that remain exporters⁵.

<i>Table 2</i>	τ_{od}	F_d^x
probability of exporting a variety	✓	✓
volume of trade	✓✓	X

Although these impacts take place at the firm level, aggregation of volume of trade for each firm-variety at the product level, as shown by (6), allows us to formulate testable predictions for the extensive margin of trade. (6) shows that the value of export is linked to the presence of firms that are able, due to their marginal cost, to sell in a foreign market. As a consequence, we could see zero trade flow if firms from nation o do not find it profitable to export to nation d . It follows that according to the model, the presence of zeros tells us that firms do not find it profitable either to produce or to export a particular product to the foreign market.

Potential negative effects due to preference erosion arise in this model either when previously exported products disappear or when trade volume decreases. The effect of a reduction in the tariff rate to third countries or general tariff cuts

⁵Note that if non tariff barriers, ROO and administrative requirements associated with unilateral trade preferences prevent firms from asking access under unilateral preference programs, none of these effects would take place.

could lead to an increase in the number of exported firms from those countries. Competition from third countries could potentially drive out former exporting firms from the country that previously benefited from a lower duty, if the ability of a firm to export is entirely due to the preference margin available before the tariff cut.

Having summarized the potential effects of unilateral trade preferences, we define the estimation strategy. We use (6) and exploit the predictions of the model in order to investigate the effect of unilateral trade preferences on the appearance and disappearance of exported products (extensive margin) and on the volume of trade of existing exporters (intensive margin). Our strategy is to use the imports of ten European countries at the six digit level of the Harmonized System and to exploit the disaggregated data in order to analyze the relationship between the switching of the zeros into positive trade flows and modification in the products covered by the European unilateral preference schemes. Unilateral trade preferences are captured by dummies that take the value of one if the product of a country enjoys preferential access.

Following Baldwin and Di Nino (2005) and Amurgo Pachego (2006), we define an uncensored profit/loss variable

$$\Pi_{od}^*[a] = \left(\frac{a\tau_{od}}{1 - 1/\sigma} \right)^{1-\sigma} \frac{B_d}{\sigma} - F_d^x, \quad a \leq a_{od}$$

where

$$\Pi_{od}[a] = \max(0, \Pi_{od}^*[a]) \rightarrow \begin{cases} \Pi_{od}[a] \geq 0, & \Pi_{od}^*[a] \geq 0 & a \leq \bar{a}_{od} \\ \Pi_{od}[a] = 0, & \Pi_{od}^*[a] < 0 & \bar{a}_{od} < a \leq \bar{a}_{oo} \end{cases}$$

The uncensored profit/loss variable represents the link between the decision of a firm to export a product and the fact that a product is exported. We do not observe profitability but we observe the appearance and disappearance of trade flow in particular tariff-lines. Exploiting this one-to-one relationship we estimate the log-linear form of (6) using a tobit technique which allows us to identify the overall effect of the covariates on the intensive and on extensive margin of trade.

As the log of zero is undefined we shift the whole distribution of trade values by one unit.

As we are interested in the observed variation of trade volume, we cannot give an economic interpretation to the raw coefficients of the tobit estimate (Wooldrige (2002); p. 520). We therefore present next to the raw coefficients, the marginal effects that follow from the tobit estimation.

We are in particular interested in two types of marginal effects. The first is the marginal effect of the independent variable on the expected value of trade, conditional on trade volume being uncensored. For the preference dummy variables, this constitutes the effect of the discrete change (i.e. from zero to one) of a preference dummy on the intensive margin of trade when trade value is

already positive and thus, it would represent the ulterior increase in trade when trade is already positive.

The second is the marginal effect of the independent variable on the change in the probability of observing a positive trade flow. For the preference dummy this represents the effect of the discrete change on the probability that trade flow is positive and it can be interpreted as the effect of the preference on the extensive margin of trade.

Mathematically these are computed respectively as:

$$\begin{aligned} E_1(y^* | y^* > 0) - E_0(y^* | y^* > 0) \\ P_1(y^* > 0) - P_0(y^* > 0) \end{aligned}$$

where E_1 is the the expected value of trade under preference, E_0 is the expected value of trade in the tariff lines that do not benefit from the preference, P_1 is the probability that trade volume is positive when preference is granted and P_0 the corresponding probability when preference is not granted.

We also report the unconditional marginal effect which represents the overall change of the dependent variable for a one unit change in the independent variable. For the preference dummy variable it is calculated as:

$$\begin{aligned} E_1(y^*) - E_0(y^*) = & P_0(y^* > 0) [E_1(y^* | y^* > 0) - E_0(y^* | y^* > 0)] \\ & + E_1(y^* | y^* > 0) [P_1(y^* > 0) - P_0(y^* > 0)] \end{aligned}$$

The total change in the unconditional expected value of trade represents thus a weighted average of the previous two marginal effects where the weights are respectively the probability that trade volume on the tariff line that does not benefit from preferential access is positive and the expected value of trade for the tariff line that enjoy preferential access (Cong, 2000). For a continuous dependent variable, which in our case is represented by the GDP of the exporting country marginal effects are instead related to the Mc Donald and Moffit decomposition.⁶

As our interest is mainly in the effect of unilateral trade preferences on the change in the number of exported goods (extensive margin), we also perform a probit estimation. Probit estimation allows us to directly test the effect of unilateral trade preferences on the extensive margin of trade. This effect is given by the change in the probability of having a positive trade flow due to an infinitesimal change in the independent variable, when the variable is continuous (i.e.GDP) and to a discrete change, in the case of a dummy variable.⁷

⁶See Wooldrige (2002) for a detailed presentation.

⁷We choose Probit rather than Logit for two main reasons. Firstly, as Wooldrige (2002) points out, a comparison in the sign of the raw coefficients of Probit and Tobit estimates constitute a rough idea of the appropriateness of the Tobit estimation, and second as a matter of convenience due to the large database.

3.1 The Data

The one-to-one relationship between range of exported goods and presence/absence of trade flows becomes evident when we use highly disaggregated data. Therefore, our strategy is to exploit disaggregated import data of a set of European countries from 118 developing countries.⁸

In this manner, we can analyze the relationship between the switching of the zeros into positive trade flows and modification in the products covered by the European unilateral preference schemes.

Trade data comes from the Comtrade databases which provides imports of ten European countries (Denmark, France, Germany, Greece, Ireland, Italy, UK, Netherlands, Portugal and Spain) at the six digit level of the Harmonized system 1988/1992 for the time period 1994-2005. The choice of countries and time is due to availability of disaggregated data.⁹ However, we do not find this constraint too limitative. The time span 1994-2005 is an interesting period for the European unilateral preference schemes: the schemes, with the exception of the Lome'/Cotonou were revised four times. These revisions have led to changes in the products covered and, following the 1995 investigation, to graduation of a large amount of sector for the most competitive beneficiary countries.

To exploit all these changes, we have defined unilateral trade preferences with dummy variables that take the value of one when the exports at the six-digit level from a particular country enjoys preferential access. For the GSP framework we built the database following the set of council regulations implemented in the period under analysis and the Wits Trains database while for the ACP preferences we have made use of the Trains database.

In order to control for effects derived from other trade regimes, we also include a FTA dummy that takes the value of one when a bilateral trade agreement between the EU and an exporting country is in force and a WTO dummy that takes the value of one when the exporting country is part of the WTO. As for the FTA dummy we consider the agreements in force during the period taken into consideration. These include the EU-Chile Association Agreement, the EU-Mexico FTA Agreement, the EU-South Africa Trade, Development and Cooperation Agreement and the bilateral Euro-med Association Agreements with Tunisia, Morocco, Jordan and Egypt.¹⁰ Regarding the other variables, since the number of varieties is related to the endowment of the exporting (origin) nation, we proxy for it with the GDP of the exporting nation. Data for the GDP comes from the World Bank Development Indicator and from the IMF database.

⁸See Appendix B for a list of included countries.

⁹For the antecedent years, we could have used other classifications and then convert trade value according to the Harmonized System. However, using this approach would create problems with the construction of precise unilateral preference dummies.

¹⁰Data on the entry into force are taken from

http://ec.europa.eu/external_relations/euromed/med_ass_agreemnts.htm (of the Euromed agreements) and from

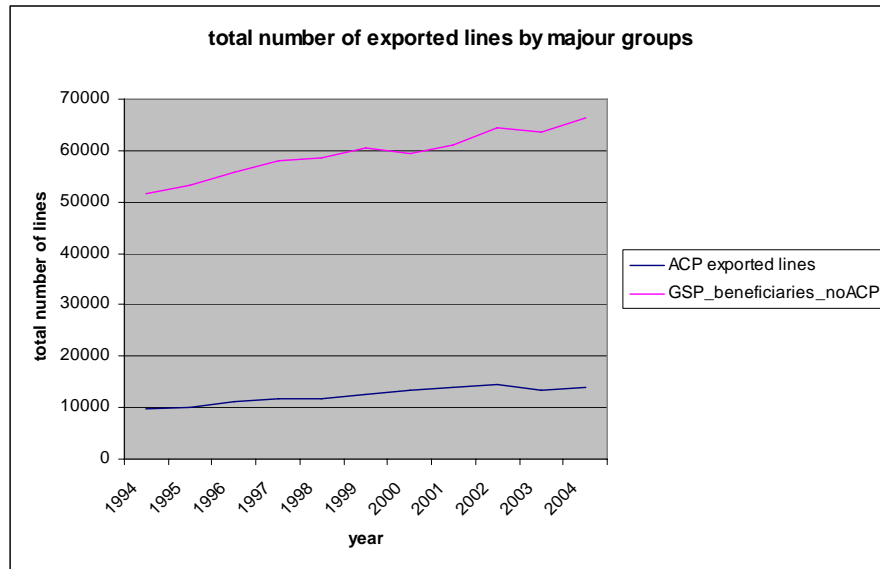
http://trade.ec.europa.eu/doclib/docs/2006/december/tradoc_111588.pdf (for the other agreements) while data on the WTO membership comes from

http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm.

Since the dependent variable is the sum of the imports of European countries, the term E_d , usually proxied with the GDP of the importing countries, will be captured by year dummy terms.

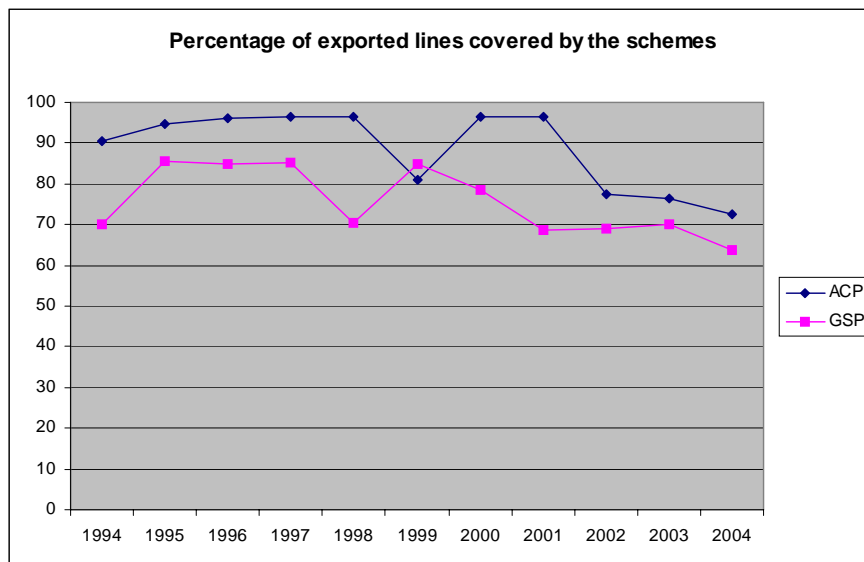
3.2 A glance at the data

Since our analysis focuses on export diversification patterns and its link with the type of preferences enjoyed by a country, we divide the panel of countries into two major groups: the first group represents the countries that enjoy ACP preferences while the second group consists of countries that enjoy only the GSP preferences. In 2004, of the 118 developing countries of the Panel, 64 are ACP beneficiaries while the remaining, with the exception of South Korea, Singapore and Myanmar are beneficiaries of one of the sub schemes of the GSP. In the first graph we plot the total number of exported lines by group of countries. As the following graph shows, beneficiary of the GSP programs export, compared to the ACP group, a larger amount of products. Additionally the number of products exported for the GSP group is increasing over time at a faster rate than for the ACP groups.



Graph two shows the percentage of the exported lines which are covered by the corresponding regime. Although by doing so we are assuming full utilization of preferences and thus we are overstating the effects, two main points emerge: first, the products exported by the ACP group tend to be those which are covered by the regime. This is less the case for the GSP group. Second, the share of exported lines covered by the regime is decreasing over the last part of the period taken into consideration. This is due to different reasons such as the

increase in the amount of tariff lines for which preferences are redundant (i.e. products for which the MFN is zero) while for the GSP schemes this is also due to the increasing amount of country sector graduation among the beneficiaries of the traditional scheme.



It is also interesting to note that for ACP countries the number of exported lines and the tariff lines under ACP preferences seem closely related. In Appendix A we show the number of exported lines and the number of exported lines covered by the ACP scheme for three countries: Mauritius, which is usually considered a country that successfully has taken advantage of these preferences, Dominica, as a representative of the Caribbean countries, and Gambia as one of the ACP Least Developed Countries.

The graphs tend to confirm the fact that the exported lines are also covered by the ACP schemes. Additionally, the amount of tariff lines exported has reached its maximum around 2001-2002. Afterwards the number of exported lines starts to fall strongly in the case of Dominica and Gambia while in the case of Mauritius the situation tends to remain unchanged.

A first look at the data leaves thus the message that while ACP countries have preferences for a larger part of their exported lines, the amount of exported products either have remained stable or have decreased.

4 Results

In order to analyze the impact of the four unilateral preference schemes on the intensive and extensive margin of trade, we analyze the changes, over the years

for each developing country. Our strategy is to use the imports, for the period 1994-2004, of ten European countries at the six digit level of the Harmonized System. We analyze the relationship between the switching of the zeros into positive trade flows and the change in product coverage of the different unilateral preference schemes. We associate the impact of unilateral trade preferences on the extensive margin of trade with the effects of the preferential schemes on the probability of observing a positive trade flow, while we associate the impact of unilateral trade preferences on the intensive margin of trade with the effects of these preferences on the expected value of trade conditional on trade being positive.

We first carry out a tobit estimation using the full panel, which includes around six and half million data points. Results are reported in Table 1. From the tobit estimation, we see that the GSP and the regime to combat drug production affect the conditional expected value of trade positively (7% and 9% respectively). Conversely, the ACP and the GSP preferences for Least Developing Countries (LDC) decrease trade, conditional on trade being positive (respectively by 11% and 19%). These marginal effects represent the impact of a discrete change of the unilateral trade preference dummies on the expected value of trade when trade is positive. They represent the effect on the intensive margin of trade, thus reflecting the impact of preferences on the average value of exports from beneficiary countries. We can see that GSP and the regime to combat drug production have increased the average value of exports, while ACP and GSP for LDC preferences have impacted negatively on the intensive margin of trade.

The extensive margin of trade is represented by the effect of preferences on the probability that trade flows are positive. GSP and the regime to combat drug production impact positively, while the impact of the ACP and GSP for LDC preferences is negative. Although, these negative marginal effects on the probability of observing a positive trade flow are rather low in terms of magnitude, they imply an anti-diversification effect of these preferences. This supports the hypothesis that preferences could lock countries in to existing structural capacities, rather than encourage export diversification.

The negative impact on the intensive margin could represent the effects of the erosion in the margin of the preferences and the consequent diversion of trade. This could be the result of product expansion, along the years, covered by the traditional GSP and the regime to combat drug production or more general tariff cuts, benefiting third countries. This would imply not only that certain type of preferences could lock countries in to existing products, but also that preference erosion has led to the exit of the least efficient producers once the barriers to third countries are lifted and competition arises.

Looking at table one, it is also interesting to note that ACP and GSP LDC preferences, as represented by the EBA initiative, have in common two characteristics: the duty free access and the stability of the agreement. The Melitz model is a one sector model, but when we deal with the volume of trade for all possible tradable products, we have intuitively an additional effect. Unilateral trade preferences could increase the number of firms and the average export

sales at the product level, but lead to specialization. Specialization arises if existing firms are concentrated within a particular sector. This effect emerges because potential entrants pay the fixed cost to enter only if the discounted value of their expected stream of profits is high enough. Unilateral preferences could generate higher profits and thus a higher number of potential entrants for particular sectors, rather than for all the products covered by the scheme.

We could thus hypothesize that stability has on one hand induced higher long term investment, but on the other hand these investments are rather concentrated in a particular sector. This could constitute a problem if long term investment is profitable only as long as countries enjoy a higher advantage with respect to third countries.

Table 3

Tobit estimates				
Marg. Effects	Latent var./ Raw coeff.	Uncond. exp. value	Cond. on be cens.	Prob. uncens.
gsp	0.523***	0.036***	0.079***	0.005***
gsp_ldc	-1.269***	-0.085***	-0.190***	-0.013***
drug_regime	0.618***	0.045***	0.094***	0.006***
ACP	-0.752***	-0.052***	-0.113***	-0.008***
Log GDPexp	0.063	0.004	0.009	0.0006
Fta	-0.07	-0.004	-0.01	-0.0007
WTO	-0.037	-0.002	-0.005	-0.0004
Pseudo R_squared: 0.1449				

*significant at 10%, ** significant at 5%, ***significant at 1%

Constant, country, time and sector dummies not reported.

Number of observations 6515756

Although, these results could be seen as supportive of a harmful effect of certain unilateral trade preferences, we cannot offer a definitive judgment without further investigation. It seems reasonable to think that ACP preferences could have encouraged specialization since the stability of preferences is present along the whole period under analysis, while GSP for LDC has offered a high coverage of products with duty free entrance only since 2001. Additionally, costs associated with asking for preferential access are rather high in the case of GSP preferences compared to ACP preferences. As already stated, this is part of the reason why ACP countries prefer to make use of ACP preferences rather than the GSP schemes. This raises the issue of how to define the unilateral preference dummies. To deal with this issue, we try another type of specification for the preference dummies: we take into consideration only the most used/favorable regime. Therefore, if a product for a country is covered by different regimes we consider preferential access only under the most favorable regime. Following the findings of Candau, Jean (2006), when a product is covered both by the Lomé and by the set of GSP schemes, only the ACP dummy will take the value of

one.¹¹

Additionally, following Subramanian and Wei (2003) we assume that the FTA is used rather than the GSP scheme. Results are reported in table four.

Table 4 Preferences as exclusive

Tobit estimates				
Marg. Effects	Latent var./ Raw coeff.	Uncond. exp. value	Cond. on be cens.	Prob. uncens.
gsp	0.733***	0.052***	0.112***	0.008***
gsp_ldc	-0.087	-0.006	-0.013	-0.0009
drug_regime	0.758***	0.056***	0.116***	0.008***
ACP	-0.902***	-0.062***	-0.136***	-0.009***
Log GDPexp	0.052	0.003	0.007	0.005
Fta	0.481***	0.034***	0.007***	0.005***
WTO	-0.07	-0.004	-0.01	-0.0007
pseudo R_squared: 0.1448				

*significant at 10%, ** significant at 5%, * **significant at 1%

Constant, country, time and sector dummies not reported.

Number of observations 6515756

We first note that the signs for GSP, the regime to combat drug production and ACP preferences remains unchanged with respect to the previous specification. Thus GSP preferences and the regime to combat drug production exert a positive effect on the extensive margin of trade. On the contrary, ACP preferences produce an anti-diversification effect. Differently from the first specification, GSP LDC preferences are not significant. The negative result of GSP for LDC in the regression that considers all programs available to a country seems to be driven by ACP LDC suggesting that least developing countries that enjoy ACP preferences, tend to use the ACP program rather than the GSP for LDC. Extension in the coverage of the products under GSP for LDC neither impacts on the extensive nor on the intensive margin of trade. According to the predictions of the Melitz model, this result can be explained by the presence of no tariff barriers and the high costs associate with the request for preferential access that prevent LDCs to make use of preferences. Brenton (2003) has shown that the EBA initiative is underutilized and he has advanced the hypothesis that underutilization could be due to strict ROO, high administrative costs and non tariff barriers. Our findings seem to confirm this hypothesis. Importantly, the fact that the previous result was driven by ACP LDC could suggest that ACP preferences have a stronger anti-diversification effect on the ACP LDC. Since

¹¹For example an exporter from Angola in 1999 could have chosen among the GSP for the least developing countries and the access granted under Lome. Therefore, in the first specification, the GSP for least developing countries and the Lome dummies for Angola will take the value of one when the tariff-line under each of these programs is covered by the respective regime in a particular year.

LDC are characterized by a stronger scarcity of resources, preferences could have lead those countries to be locked into existing capacities more heavily.

In table five we report the results that follow from a probit estimations. These represent a robustness check for the effect of unilateral trade preferences on the extensive margin of trade. The estimated marginal effects confirm the previous results for both specifications of the dummy variables. When we thus look at all potentially tradable products, ACP preferences produce an anti-diversification effect while the GSP and the regime to combat drug production impact positively on the extensive margin of trade.

Table 5

Probit estimate	Preferences as not exclusive		Preferences as exclusive	
	Raw coeff.	Marg. effects	Raw coeff.	Marg. effects
gsp	0.073***	0.009***	0.093***	0.012***
gsp_ldc	-0.085***	-0.010***	-0.005	-0.0006
drug_regime	0.076***	0.010***	0.089***	0.011***
ACP	-0.035***	-0.004***	-0.027***	-0.003***
Log GDPexp	-0.002	-0.0002	-0.003	-0.0004
Fta	-0.003	-0.0003	0.066***	0.008***
WTO	-0.003	-0.00003	-0.006	-0.0007
	Pseudo R2 = 0.2809		Pseudo R2 = 0.2802	

*significant at 10%, ** significant at 5%, ***significant at 1%

Constant, country, time and sector dummies not reported.

Number of observations 6515756

Concerning the other results from both tobit and probit estimations, the FTA dummy is not significant when the dummies reflect preferential schemes as non-exclusive while it becomes significant with a positive sign when we deal with exclusive dummies. This could be due to the fact that the entry into force of the FTA did not change the trade pattern with respect to the situation in which the FTA members had only the GSP. It is also worth to note that the impact of the FTA may have taken place in the past rather than after the official conclusion of the agreement. Regarding the other variables, neither the GDP of the exporting country nor the WTO dummy are significant. Indeed, the GDP of the exporting countries turns out to be a poor proxy for the number of varieties. A better measure would be the production at the six digit level but data is not available. The total GDP of the country could be considered a valid proxy if it has a positive correlation with production data at the six digit level. Therefore, we can either conclude that this correlation is captured by the sector dummies or simply that the country dummies are taking away the effect of the GDP variable. Concerning the WTO dummy, we are not surprised by the results. The WTO effect can be understood as the potential benefits derived by general

tariff cuts rather than a membership dummy and members of the WTO tend to apply the MFN regime also to non-member countries.

Looking at all product lines gives an overview of a general effect and in doing so results suggest that ACP preferences have lead to an anti- diversification effect while positive effects are present for the GSP subschemes except in the case of the GSP for LDC. These results take into account the full set of products which can potentially be traded. This does not preclude that export diversification can occur along the value chain of a particular sector. For instance, preferences could lead to focus in a particular sector and most likely in the sectors for which having preferences still makes a difference. Following the studies on utilization rates, we see that indeed utilization of preferences is very high in the case of agricultural products and to a certain extent in the textile/clothing sector. It seem thus logical to conclude that in these sectors having unilateral trade preferences still makes a difference.

We thus provide estimates looking at the agricultural and at textile/clothing products. In doing so we want to see whether anti-diversification effects occur due to the concentration along the value chain of particular sectors. We do so by looking at previous studies on the utilization rates and since we are trying to stay as close as possible to the evidence on the utilization rates we keep the definition of the dummies considering the best regime available.

Results for the agricultural products are reported in the following table:

Table 6 Agriculture sector (chapter 1-24), Preference as exclusive

Tobit estimates	Latent	Uncond.	Cond. on	Probab.
Marg. Effects	var.	exp. value	be cens.	uncens.
gsp	2.164***	0.260***	0.389***	0.063***
gsp_ldc	-0.057	-0.006	-0.01	-0.001
drug_regime	2.493***	0.299***	0.448***	0.073***
ACP	2.503***	0.301***	0.450***	0.073***
Log GDPexp	-0.270***	-0.032***	-0.048***	-0.007***
Fta	0.977***	0.117***	0.175***	0.028***
WTO	-0.08	-0.009	-0.014	-0.002
pseudo R_squared: 0.1161				

*significant at 10%, ** significant at 5%, ***significant at 1%

Number of observations 903226

Constant, country, time and sector dummies not reported.

With the single exception of GSP for LDC, which remains not significant, having unilateral trade preferences increases the probability that trade flows are positive. By the same token it increases the amount of trade when the trade flow is already positive and thus, unilateral preference schemes further encourage the exports to the European Union.

Concerning the magnitude of the marginal effects, the ACP preferences and the regime to combat drug production have the highest impact. ACP preferences' impact on the conditional expected value of trade is around 45% and the effect on the probability that a good is traded is 7%. The marginal effects in the case of the regime to combat drug production are respectively around 44% and 7%.

Table 7 Textile/ Clothing sector (chapter 50-63), Preference as exclusive.

Tobit estimates	Latent	Uncond.	Cond. on	Prob.
Marg. Effects	var.	exp. value	be censored	uncens.
gsp	1.266***	0.181***	0.242***	0.023***
gsp_ldc	0.258	0.037	0.049	0.004
drug_regime	1.732***	0.247***	0.331***	0.032***
ACP	0.392	0.056	0.075	0.007
Log GDPexp	-0.751***	-0.107***	-0.143***	-0.013***
Fta	0.714**	0.102**	0.136**	0.013**
WTO	0.042	0.006	0.008	0.009

pseudo R_squared:0.1725

*significant at 10%, ** significant at 5%, ***significant at 1%

Number of observations 1047655

Constant, country, time and sector dummies not reported.

Table seven presents the results for the textile sector. In this case, only GSP and the regime to combat drug production have a positive impact, ACP and GSP for LDC coefficients are not statistically significant. The positive impact of the regime to combat drug on the intensive margin of trade is around 34% while on the extensive margin of trade the result is 3%. The fact that marginal effects of the GSP for LDC are still not significant remain supportive of the idea that stricter rules of origin have prevented exporters of LDCs not part of the ACP group from taking full advantage of preferential access.

Regarding the marginal effect of the exporter GDP, it seems that GDP is behaving as a development indicator rather than a proxy for the number of varieties. It is quite plausible that the country dummies are instead capturing this effect due to the short time dimension of our panel. As a matter of fact when the country dummies are omitted, the marginal effect of the exporter's GDP becomes positive. However, we prefer not to omit the country dummies in order to avoid biased estimates for the other variables.¹²

In the following table we present the raw coefficients and the marginal effects of the probit estimates when the dummies are coded as exclusive. The magnitude and size of the marginal effects do not differ from the result of the

¹²For a similar conclusion see also Medvedev (2006). Indeed, it is rather difficult to interpret the effect of the GDP on disaggregated trade data as a better proxy would be the use of sector production data.

tobit regression and tend to confirm previous results. The only changes are in the statistical significance of the ACP dummy for the textile sector. However, note that the marginal effects are extremely low in magnitude in both the tobit and the probit regression. Thus although these dummies change in statistical terms, they do not change in terms of economic significance.

Table 8 Preferences as exclusive

Probit estimates	Agriculture		Text./Clothing	
	Raw coeff.	Marg. eff.	Raw coeff.	Marg. eff.
gsp	0.362***	0.060***	0.158***	0.021***
gsp_ldc	0.011	0.001	0.029	0.003
drug_regime	0.386***	0.069***	0.180***	0.026***
ACP	0.396***	0.060***	0.088***	0.011***
Log GDPexp	-0.046***	-0.006***	-0.077***	-0.010***
Fta	0.163***	0.025***	0.118***	0.016***
WTO	-0.016	-0.002	0.006	0.0007
pseudo R_squared	0.2039		0.3474	

*significant at 10%, ** significant at 5%, * **significant at 1%

Constant, country, time and sector dummies not reported.

5 Conclusion

Unilateral trade preferences constitute a subject for debate not only in terms of effective utilization but also in terms of possible negative effects on the developing countries' effort in the diversification process.

Using a tobit and a probit analysis we have shown that the impact of unilateral trade preferences on both the intensive and extensive margin of trade is strictly linked to the type of program implemented and to the sector being analysed.

Looking at the different schemes, it is interesting to note that, while the regime to combat drug production and the GSP had a positive effect on both the intensive and extensive margin of trade, ACP preferences seem to have lead to an anti-diversification effect when we consider all possible tradable products. When we consider only the best regime available to a country, the conclusion does not differ. The only exception is the GSP for LDCs, which does not seem to have an impact on the export pattern of LDCs that enjoy only GSP preferences. This would confirm the idea that even if preferences allow duty free entrance, stricter ROO, high administrative requirements and non tariff barriers preclude non ACP LDCs from asking preferences.

We have shown that unilateral trade preferences have increased the range of the exported products particularly in the agricultural sector also for ACP countries. This could suggest that ACP preferences have lead to the concentration of exports in the agricultural sector, where ACP preferences have the highest impact.

Looking at the results and at the different features of the various schemes, a preliminary conclusion supports the idea that unilateral trade preferences seem to have lead to an anti-diversification effect in the case when preferences were granted under permanent and stable schemes, such as the ACP-Lomé framework.

As the process of liberalization continues, specialization pattern could have problematic repercussions in those countries that have followed a specialization pattern due only to more beneficial market access than the MFN regime. Although, our empirical strategy does not deal directly with the issue of margin erosion, there are some reflections of a negative impact of margin erosion on ACP countries. Effectively, the period under study has been subject to the liberalization process that followed the Uruguay Round commitments of the European Union. The negative impact of ACP preferences on the volume of trade seems thus to suggest that negative effects due to preference erosion are already in place.

Additionally, the concentration of resources in particular sectors seems to suggest that preferences, if stable, could lead to investment along the value chain of sectors in which preferences are more valuable. It remains thus a question to identify in which part of the value chain, ACP preferences have a higher impact.

We conclude that unilateral trade preference could have helped developing countries in exporting products in sector where trade liberalization is rather difficult, as represented by the findings of the estimates for the agricultural sector. However, we do not know how much unilateral trade preferences can indeed constitute a valid substitute for a pure MNF regime.

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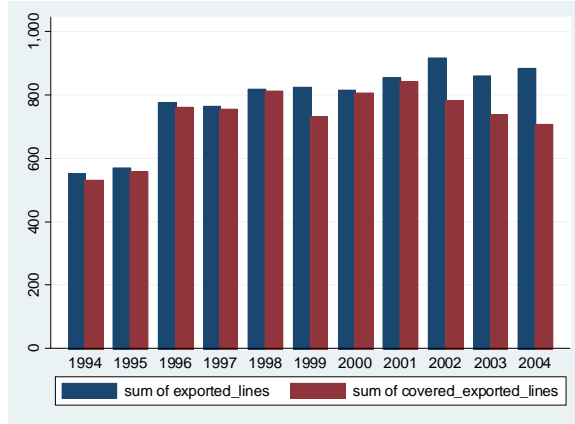
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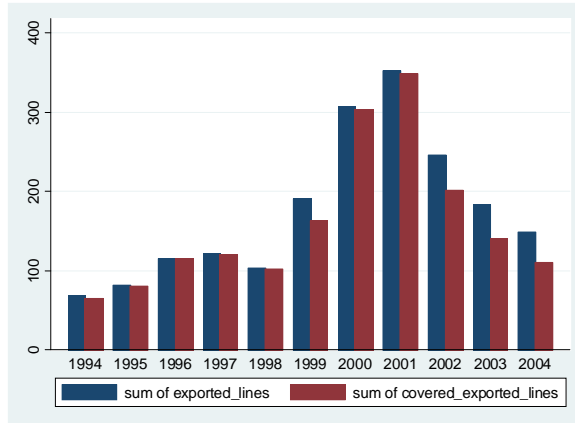
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Appendix A

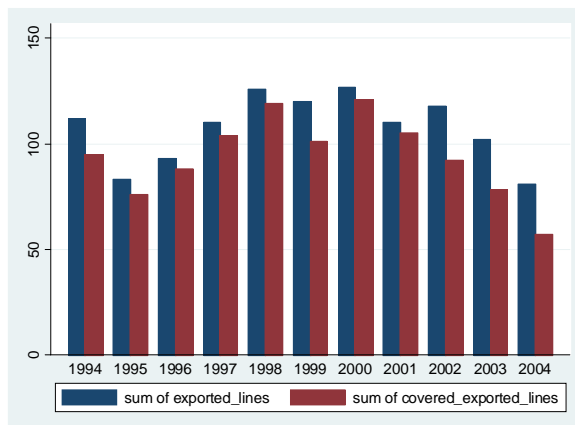
Mauritius



Dominica



Gambia



Appendix B: list of countries

Algeria	Ghana	Panama
Angola	Grenada	Papua New Guinea
Antigua and Barbuda	Guatemala	Paraguay
Arab Emirates	Guinea	Peru
Argentina	Guinea-Bissau	Philippines
Bahamas	Guyana	Qatar
Bahrain	Haiti	Rwanda
Bangladesh	Honduras	Sao Tomé and Príncipe
Barbados	India	Saudi Arabia
Belize	Indonesia	Senegal
Benin	Iran	Seychelles and dependencies
Bhutan	Ivory Coast	Sierra Leone
Bolivia	Jamaica	Singapore
Brazil	Jordan	Solomon Islands
Brunei Darussalam	Kenya	South Africa
Burkina Faso	Kiribati	South Korea
Burundi	Kuwait	Sri Lanka
Cambodia	Laos	St Christopher and Nevis
Cameroon	Lebanon	St Lucia
Cape Verde	Liberia	St Vincent
Chad	Libya	Sudan
Chile	Madagascar	Surinam
China	Malawi	Syria
Colombia	Malaysia	Tanzania
Comores	Maldives	Thailand
Congo	Mali	Togo
Congo (Dem. Rep.)	Marshall Islands	Tonga
Costa Rica	Mauritania	Trinidad and Tobago
Cyprus	Mauritius	Tunisia
Djibouti	Mexico	Uganda
Dominica	Mongolia	Uruguay
Dominican Republic	Morocco	Vanuatu
Ecuador	Mozambique	Venezuela
Egypt	Myanmar	Vietnam
El Salvador	Nepal	Western Samoa
Equatorial Guinea	Nicaragua	Yemen
Ethiopia	Niger	Zambia
Fiji	Nigeria	Zimbabwe
Gabon	Oman	
Gambia	Pakistan	