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The Impact of trade preferences on export prices in the European Union - who captures the preference rent?

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Abstract: Preferential Trade Agreements (PTAs) aim at increasing trade flows via reductions on applied tariffs and the incentives created by the difference between the applied and the most favoured nation (MFN) tariff, the preference margin. An often omitted element in PTAs evaluation is the possibility that the wedge between preferential and MFN tariffs may induce a preference rent. This paper analyses empirically who captures the preference rent by exploiting a unique dataset of imports in the European Union at a highly disaggregated level (CN-10) linked to information on the preferential regime used and the tariff applied. In order to remove potential bias and measurement errors from comparing preferential prices from specific countries and products with average MFN prices, this paper uses the prices from the same country, product and year. This is possible since we observe in the database a large number of cases where in the same year a preferential regime is both utilised and non-utilised. Our main findings suggest that on average an exporter obtain a larger price margin under a preferential regime than under MFN. However, this preference rent is only partially appropriated by exporters with a pass-through coefficient from preference to price margins that oscillates between 0.16 and 0.5.

JEL Classification: F13, F15

Key Words: Preferential Trade Agreements; Unilateral preference; GSP; EBA; Price margins; Preference rent

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1. Introduction

The large increase in Preferential Trade Agreements (PTAs) in recent decades has been widely documented. The European Union (EU) has been a champion in this area, having signed or being involved in the process of signing PTAs with almost all the countries in the American and African continent.[1] In addition, the EU grants unilateral preferential access to its market for a large number of developing countries since the early 1970s through the Generalised System of Preferences (GSP), the Cotonou Agreement (until 2008) and the Everything but Arms (EBA) initiative for Less Developed Countries (LDCs).[2] Unilateral preferences, and especially its most important scheme, the GSP, are a central pillar of the EU's strategy towards developing countries.

Preferential access is expected to transmit sustainable development via higher levels of exports and imports. This can enable countries to develop more efficient industries via exploiting new relative comparative advantages enhanced by preferential margins, potentially leading to increases in productivity, competitiveness and diversification. At the same time, it may also encourage more investment.

While most evaluations of preferential schemes focus on the impact of tariff preferences on trade flows, very little is known about a potential additional benefit for preference eligible exporters: the preference rent. Tariff preferences may impact the prices that exporters receive by introducing a wedge in the border price of that product and effectively creating a preference rent. The question is, therefore, whether exporters capture these rents and obtain higher prices.

The objective of this paper is to analyse empirically whether preferential margins in the EU are transmitted to export prices. In order to do so, we use a highly disaggregated dataset at the product level (CN-10 digits disaggregation) of imports in the EU for the period of 2002-2008. A unique feature of this dataset is the fact that we can identify export flows by preferential scheme. This allows us to establish the effective tariff paid for each export flow (product/country/year), and whether preferences are utilised. This feature is instrumental for the empirical methodology, since observation of both utilisation and non-utilisation episodes allow us to compute the price margin.

The main finding of this paper shows that preferential tariff margins are transmitted to price margins. However, when product and country effects are considered and more importantly, when we control the potential selection bias from utilisation and non-utilisation episodes, the estimated pass-through oscillates between 0.15 and 0.5.

This paper is organised as follows. Section 2 introduces the issue of preference rents and price margins. Section 3 briefly describes the existing evidence. Section 4 describes the

[1] Excluding the US, Venezuela and Cuba in America and Mauritania in Africa.

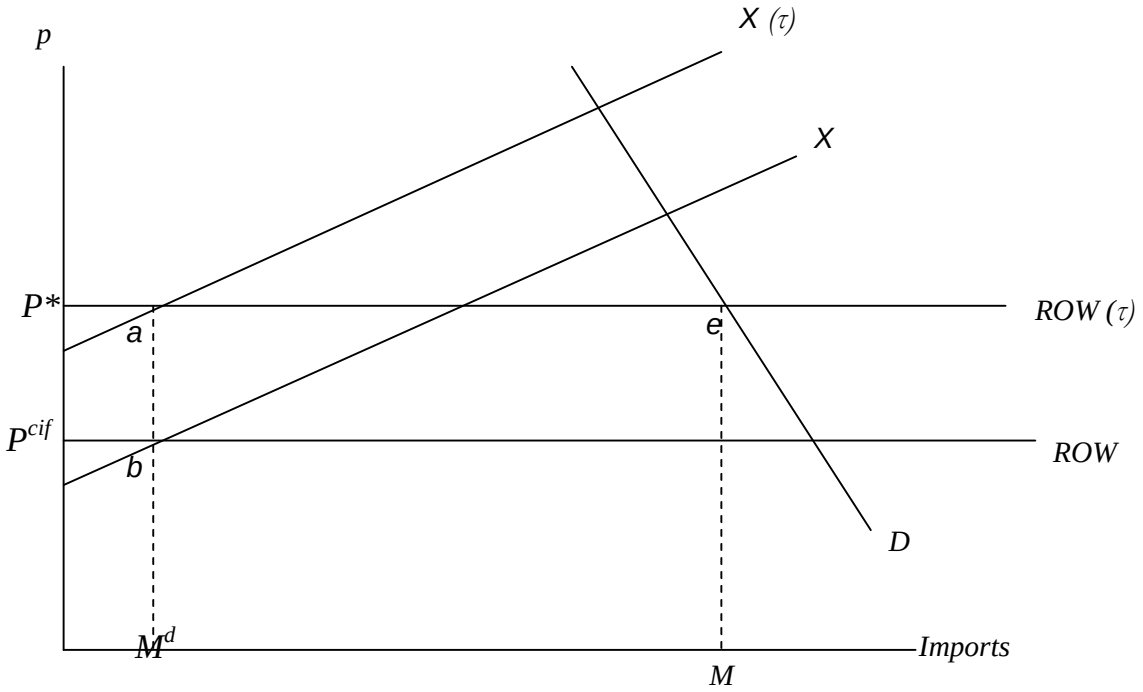
2 Within the GSP system, the EU provides preferential access to the EU market to 176 developing countries in the form of reduced tariffs for their goods. Under EBA, part of the GSP system, 49 LDCs have duty free quota free access to the EU to all products excluding weapons since 2001. In addition to weapons, banana and rice were excluded from EBA between 2006 and 2009, and sugar is being transitioned until 2012 with minimum prices.

methodology and Section 5 summarises the data. Section 6 analyses empirically the impact of tariff margins on export prices and price margins. The last section concludes.

2. Preference Margins and Prices

To illustrate the idea of a price rent associated to preferential trade, we can think of exports for a simple homogenous product *x* from exporter *i* to the EU, a competitive market sold at world prices p^* . A country too small to influence the world price, is entering the EU paying an MFN tariff at a *c.i.f* price $p_{xi}^{cif} = p^*/(1+\tau)$ determined by equilibrium *e* and exporting M-M^d. In the short-run, keeping exporters *i*'s export share constant, if the tariff is removed there is a gap $p^* > p_{xi}^{cif}$ (distance ab in the Figure below) which corresponds to the rent $\tau\, p_{xi}^{cif}$. This rent can be distributed between the exporter and the importer.[3] If p_{xi}^{cif} rises to p^* then there is full transmission of the preference rent to exporter prices and the exporter appropriates the full amount. However, if p_{xi}^{cif} remains the same, then importers absorb all the price rent that then may (or may not) be passed to consumers by lowering prices. As a result, one important question that arises when assessing preferential schemes is who appropriates the rent, exporters or importers.

Figure 1: Prices and the Preference Rent



While for the case of homogenous products, the existence of a price margin associated to preferential tariff margin is illustrated in Figure 1, when imperfect competition and product differentiation are considered, the final outcome is less clear. Imperfect competition implies variable mark-ups. For example, under alternative competition frameworks, changes in tariffs may change exporters' strategic price decisions. Chang and Winters (2002) for example, show in a Bertrand monopolistic setting how changes in preferential treatment in the Common Market of the South (MERCOSUR) have impacted on exporters'

3 The main assumption here is that the tariff reduction is not passed to the consumer. For example, in a monopolistic competition setting with Dixit-Stiglitz preferences, the exporter price would remain unchanged and the price for consumers would be lower, increasing the demand for that variety.

prices. In addition, Hellerstein (2006) shows incomplete pass-through from foreign shocks to import prices in the US, where firms adjust their mark-ups as a pricing to market strategy.

While market power and the capacity to change mark-ups have been shown to affect export prices significantly, product differentiation is also an important dimension that determines export prices. Vertical differentiation and quality differentials between products can be substantial, especially when working with trade data classifications. For example, Schott (2004) shows that as a result of quality differentials, there are large differences in unit values within disaggregated product categories. In this case, different varieties within the same Harmonized System (HS) product may be competing in different quality segments, even at higher levels of disaggregation.

Another important dimension related to pricing-to-market that has been stressed by the literature is the issue of distance. Alchian and Allen (1964) analysed the fact that countries were more likely to export higher quality exports to more distant markets. Hummels and Skiba (2004) confirm this hypothesis and show a positive correlation between distance and export prices.

More recently, models adopting Melitz (2003) heterogeneous firms' framework have started to pay more attention to export prices. In the original model, self-selection to export markets depends on productivity and trade costs, and as a result, the prediction of the model is that firms exporting to more distant markets have lower prices. However, this is at odds with recent evidence for the US (Bernard et al. 2007), Mexico (Kugler and Verhoven, 2008), Chile (Hallak and Sivadasan, 2009) and Hungary (Görg et al, 2010). In order to accommodate the empirical finding fact that export unit values increase with distance, Baldwin and Harrigan (2007) propose a model that incorporates heterogeneous quality to the Melitz model.

While the issue of pricing to market and distance refers mainly to the price differential within exporters of the same country to different export markets, the existing evidence reinforces the importance of quality differential and variable mark-ups when looking at export prices.

3. Existing Evidence on Preference Rents

There are a large amount of studies analysing export prices, the law of one price, pricing-to-market, the degree of pass-through of different shocks to export or import prices (see Campa and Goldberg, 2006). However, very few studies to our knowledge have analysed empirically the degree of pass-through of tariff preference margins to export prices and price margins. Olarreaga and Özden (2005) study the impact of AGOA on export prices of African exporters of apparel to the US. They find that only a small share of the tariff rent remained in the hands of African exporters. Özden and Sharma (2004) focus on exports of apparel to the US under the Caribbean Basin Initiative (CBI) and find that preferential exporters capture two thirds of the preference margin, increasing their prices by 9%. Alfieri and Cirera (2007) find for a group of primary commodities an incomplete pass-through from tariff margin to price margin ranging between 0.4 and 0.6.

An important limitation of these studies is the focus on a specific set of commodities. In addition, the use of counterfactual price - the price that the same variety[4] would pay under MFN treatment is problematic since this is not observed and needs to be inferred.

4. Methodology

The methodology starts by analysing the degree of pass-through from tariffs to export prices. If preferential exporters appropriate the preference rent, we should expect that within a product, tariffs are negatively transmitted to export prices, so other things remain constant, preferential exporters obtain higher prices when not paying duties.

We estimate a reduced form equation for export prices. In an imperfect competition setting, prices depend on rival prices (Chang and Winters, 2002), which we proxy as the average price for that product on the EU market. In addition, export prices depend on productivity and unit costs, their market power, the tariff paid, the degree of quality differentiation, and the existing margin (if there is pass-through).

$$p = f(\bar{p}, c, \phi, \Delta\tau, d, \alpha, q) \qquad (1)$$

We parameterise equation *(1)* in logarithms as:

$$p_{ijt} = \beta_0 + \beta_1 \bar{p}_{jt} + \beta_2 \phi_{ijt} + \beta_3 \tau_{ijt} + \beta_4 \frac{(1+\tau_{jt}^{mfn})}{(1+\tau_{ijt})} + \beta_4 c_{it} + \lambda_{ij} + \gamma_t + e_{ijt} \qquad (2)$$

Where the log of the export price p_{ijt} depends on the average log price for the product on that year $\bar{p}_{jt}$, the market share of the country on the same year and product $Ø_{ijt}$, the tariff paid, the ratio between the MFN tariff and the effective tariff paid (preference margin), a country specific quality parameter proxied by the level of GDP per capita and a set of fixed and time effects. We assume that the country-product (variety) fixed effects λ_{ij} in (3) absorb time-invariant specific unit costs c_{ij} and productivity, product specific fixed effects and country specific effects such as distance.

$$\lambda_{ij} = c_{ij} + d_i + \delta_j \qquad (3)$$

The previous specification does not address directly the issue of preference rent transmission to export prices. If preferential margins are fully transmitted we would expect that an exporter would obtain a higher price exporting under preferential scheme than under MFN treatment, and the difference being the tariff margin. A problem that arises when trying to estimate this specification is the choice of counterfactual price. Often, we only observe when an exporter uses a preference or pays the MFN tariff, but not both simultaneously. One option is to use the average MFN unit value for that product and period in the EU market as an approximation to the price that preferential exporters should receive when exporting under the MFN regime. However, by doing this, we risk comparing very different varieties with different quality attributes and, therefore, different prices.

[4] We use the term variety to define a product originated in a specific country.

An advantage of our comprehensive dataset is that it includes all products imported by the EU from 2002 to 2008 disaggregated by country, product and year according to the tariff paid. This enables us to observe exports from the same country, product and period under MFN and preferential regimes in the case of exporters utilising and not utilising preferences in the same period. Under the assumption that quality differentials and price responses within exports of the same country and product are minimal, especially since for small countries there may be a single firm exporting the product, comparing preference utilisation and non-utilisation prices allow us to estimate whether there is any transmission from tariff preference margins to export price margins without biases.

As a result, we estimate a second specification uses the ratio of unit values when preferences are utilised vs. when these are not utilised as dependent variable. In this specification we expect that price ratios levels depend on country market power and product structure, proxied by market share and GDP per capita, the preference margin, time effects and a variety fixed effects to capture variety specific elements.

$$\frac{p_{ijt}^{pref}}{p_{ijt}^{MFN}} = \beta_0 + \beta_1 c_{jt} + \beta_2 \phi_{ijt} + \beta_3 \frac{(1+\tau_{jt}^{mfn})}{(1+\tau_{ijt}^{*})} + \lambda_{ij} + \gamma_t + e_{ijt} \qquad (4)$$

While minimising the risk of product differentiation biases, one potential problem of this approach is the fact that by using only those observations where we observe in the same country/product/period, both preference utilisation and non-utilisation, we effectively carry out a sample selection. We exclude those observations not eligible for preferential treatment, and for those eligible, we only use those cases where both utilisation and non-utilisation of preferences are observed and the price ratio can be computed. Thus, if some of the determinants of this selection also explains the price ratio, such as income per capita of exporter, then OLS estimates of the price margin equation are biased. In order to correct this potential bias we need to use a Heckman (1979) procedure with a selection equation able to control for the different alternative regimes. This can be done by employing a multinomial logit framework for selection, where we explain discrete outcomes such as non-eligibility, utilisation, non-utilisation and both utilisation and non-utilisation happening in the same period.

5. The Data

We use import data at the country level and disaggregated at the 10 digits level of Combined Nomenclature(CN-10) supplied by the EC. Trade flows are aggregated each year per country, product and tariff regime. The tariff regimes are: MFN; GSP, GSP+ or EBA and other preferential regime (Cotonou and other FTAs); tariff suspension, and; MFN under quota or preferential under quota. In around 80% of the observations we only observe one tariff regime, but on the remaining cases we may observe two regimes (more than 2 in only 1% of observations). We match import data observations with tariff data from TARIC.[5]

[5] Some ad valorem conversions have not been possible when there was the need for reference prices. The total loss of observations represents around 5% of the value of imports.

Observations with trade flows below €500 are dropped, since they do not represent any meaningful trade. We use unit values as proxy for prices. Any errors on the inputted values or quantities reported are likely to generate noisy unit values. For this reason we apply the Hadi (1992) filter for outliers, for each product and year. After cleaning the dataset we found around 1.5 million observations with unit value and tariff data available, for imports to the EU from 219 countries/territories during the period 2002-2008. In total we have more than 19,000 products, since a significant number of product codes are added during the period and some new products imported. For around 4,000 of these products we observe less than 10 export flows for the whole period.

Tariff Margins

Despite the large amount of countries eligible for preferences, the low product coverage, stringent rules of origin (RoO), small tariff margins and resultant low degree of preference utilisation have raised concerns about the *de facto* importance of preferences driving trade flows. Since our database allow us to distinguish import flows in the EU according to the tariff paid, we can identify the effective tariff margin experienced by each flow.

We define the tariff margin as the log ratio between the MFN tariff for that product and year, and the tariff paid by that country, product and period, equation (5). Adding tariff data to our dataset implies the conversion from *non-ad valorem* to *ad valorem* tariffs. Due to the existence of seasonal duties we observe for a very small fraction of flows (1.34%), mainly in agriculture, a negative margin, where effective tariffs paid were larger than average MFN tariffs. For most flows, however, tariff margins are zero. 67% of trade flows to the EU market from 2002 to 2008 in our dataset have zero MFN rates, and only 31.7% of the flows enjoy a positive tariff preference margin.

$$\tau_{ijt}^{margin} = \log\left[\frac{1+(\tau_{it}^{mfn}/100)}{(1+(\tau_{ijt}/100)}\right] \qquad (5)$$

Decomposing positive margin flows and eliminating extreme values arising from averaging seasonal tariffs, indicate that a large number of products with positive margins, experience margins equivalent to a tariff difference below 4%. The average tariff margin for the whole sample is equivalent to a tariff difference of 1.8%, while the average tariff margin for flows with positive margins (and excluding 5% extreme values) is equivalent to around 5%.

Figure 2 Probability distribution function - positive margins

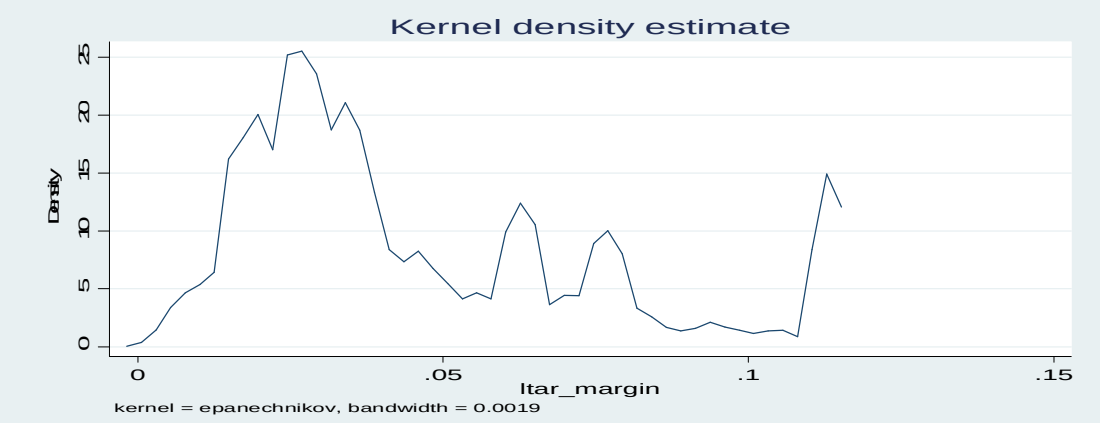


Table 1 shows the 10 countries with relatively large average tariff difference between the tariff effectively paid and the MFN tariff. The list is dominated by LDC countries, mainly from Africa.

Table 1 Countries with Larger Average Tariff Margin

Country	**Average tariff difference Average (tariff paid%-MFN tariff%)**
Swaziland	8.34%
Lesotho	6.27%
Laos	6.26%
Botswana	5.82%
Ecuador	5.74%
Maldives	5.68%
Turks and Caicos Islands	5.60%
Fiji	5.54%
Malawi	5.51%
Gambia	5.46%

Source: Author's own calculations from TARIC

Export Prices

A close look at the data shows the existence of very large variations within the same narrowly defined CN-10 digits product. In order to compare price variation across products, for each product and year we compute the coefficient of variation of unit values equation *(6)*: the estimated standard deviation normalised by the estimated mean. Figure 3 shows the probability distribution function of the coefficient of variation for all product-year from 2002 to 2008 under four different classifications based on Rauch's conservative classification (Rauch, 1999): all products, homogenous products, differentiated products and referenced price products. Table 2 summarises the main statistics.

$$CV_{it} = \frac{\sigma_{it}}{\mu_{it}} \qquad (6)$$

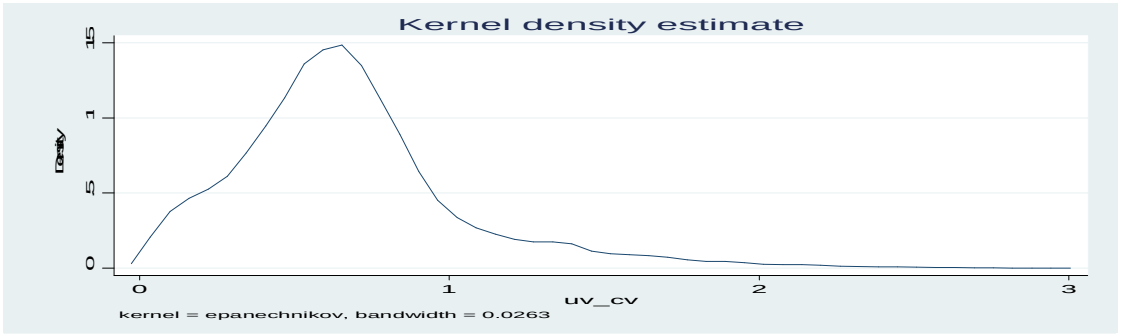
Table 2 Main Statistics Coefficient of Variation Unit values by Product and Year

	Observations	**Mean**	**Std deviation**	**Skewness**	**Kurtosis**
Full sample	84666	0.6787	0.3792	1.3245	6.0645
Homogenous products	6057	0.5461	0.3997	1.5412	6.3788
Differentiated products	46122	0.7001	0.3293	1.5105	7.2522
Reference price products	26526	0.6577	0.4450	1.2617	4.9415

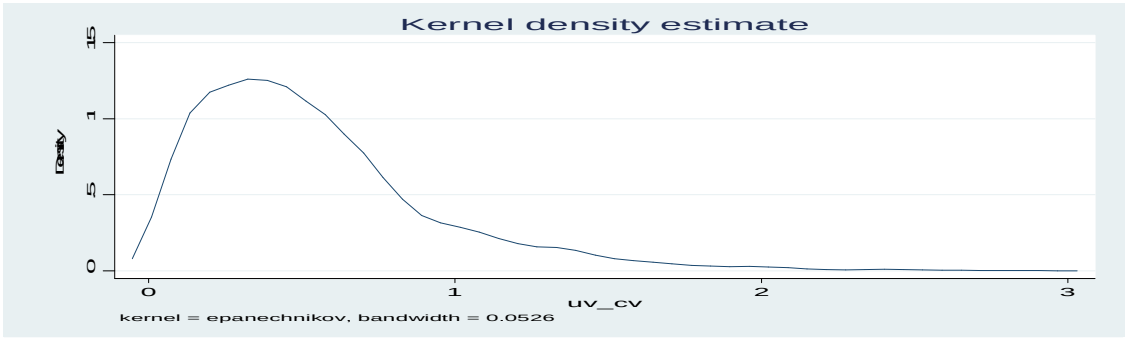
Source: Author's own calculations from COMEXT

Figure 3 Probability distribution functions for coefficient of variation of unit values by product and year

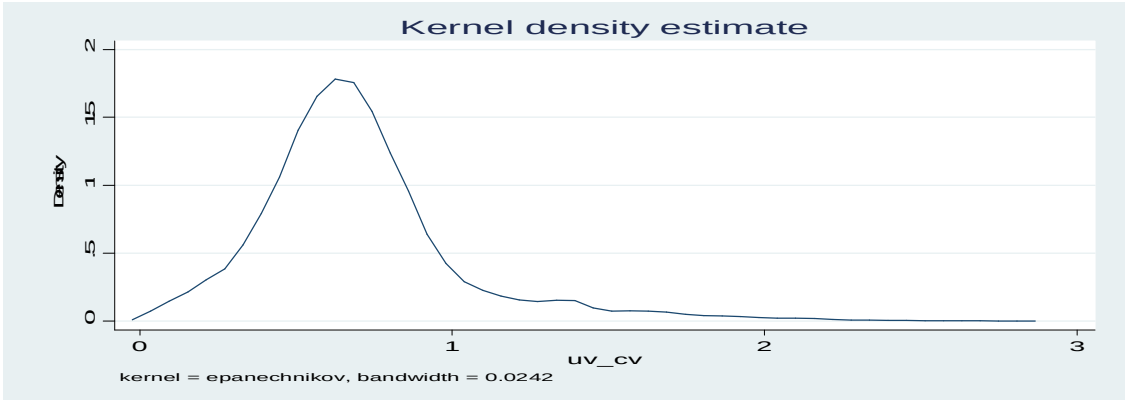
(a) Full sample



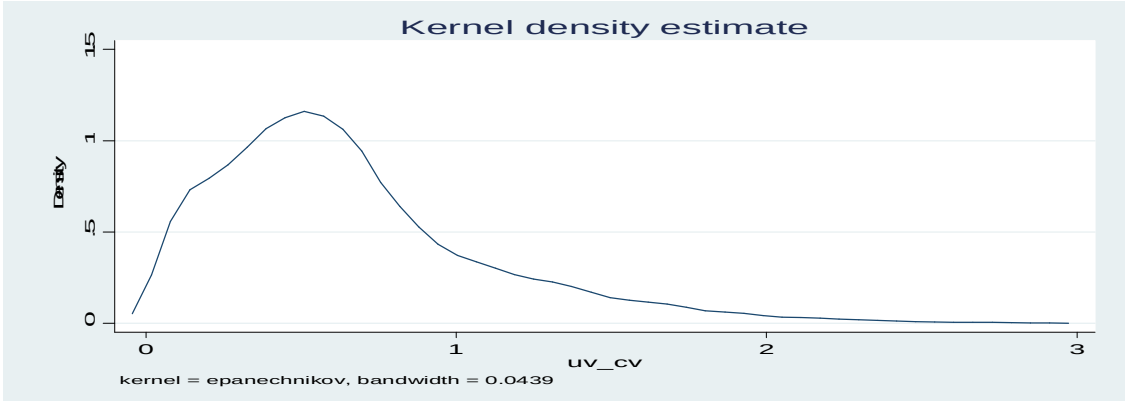
(b) Homogenous (Rauch Classification)



(c) Differentiated (Rauch Classification)



(d) Reference goods (Rauch classification)

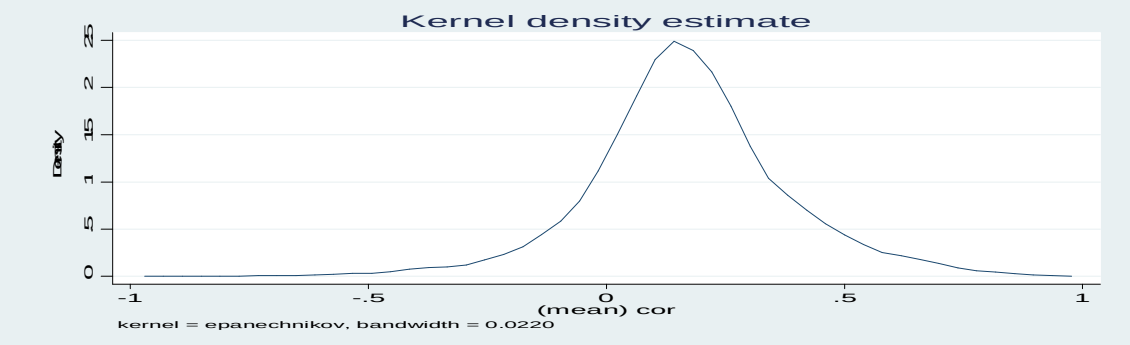


The first diagram in Figure 3, where all the products are included show very large variations of unit values that cannot be explained by differences in tariff access in the EU market. On average, the standard deviation of unit values within product in the same year is 68% times the estimated mean. All four plots show a long tail on the right hand side indicating the presence of a few products with extremely large variation of unit values. As expected, homogenous and reference price products show lower variation within CN-10 and their distribution are more skewed to the left.

Surprisingly, however, the mean of the coefficient of variation for reference price products is similar to the full sample and the standard deviation is large, indicating considerable variation of unit values within reference price products. These results are clearly indicative of the problems arising with quality, and vertical differentiation in general, within product categories.

Schott (2004) suggests that richer countries tend to obtain higher export prices. Furthermore, new evidence at the firm level shows that more productive firms tend also to obtain higher prices. As a result, we explore the correlation between export prices and income per capita. Figure 4 shows the probability distribution function of all the correlation coefficients estimated for each individual product at CN-10 with more than 10 observations during the period 2002-2008.[6] Surprisingly, the results suggest low correlation between prices and GDP per capita for most products, with an average correlation coefficient of 0.17. Since the dataset contains all the universe of products, including homogenous and reference price products, we look at the correlations when including only differentiated products according to Rauch's classification. Price differentiation is more likely when products are differentiated. However, we obtain a similar correlation pattern with a larger but similar average low correlation of 0.19.

Figure 4 Correlation log unit value with log GDP per capita



Price Ratios for Preferential and Non-preferential Exporters

The main interest of the paper is to understand the degree of pass-through from tariff to price margins. The initial question is, therefore whether this price margin exists and, other things constant, exporters under preferential schemes receive higher prices than exporters under MFN.

We compute for each product and year the average unit value across exporters under preference and exporters under the MFN regime, for products where some exporter is

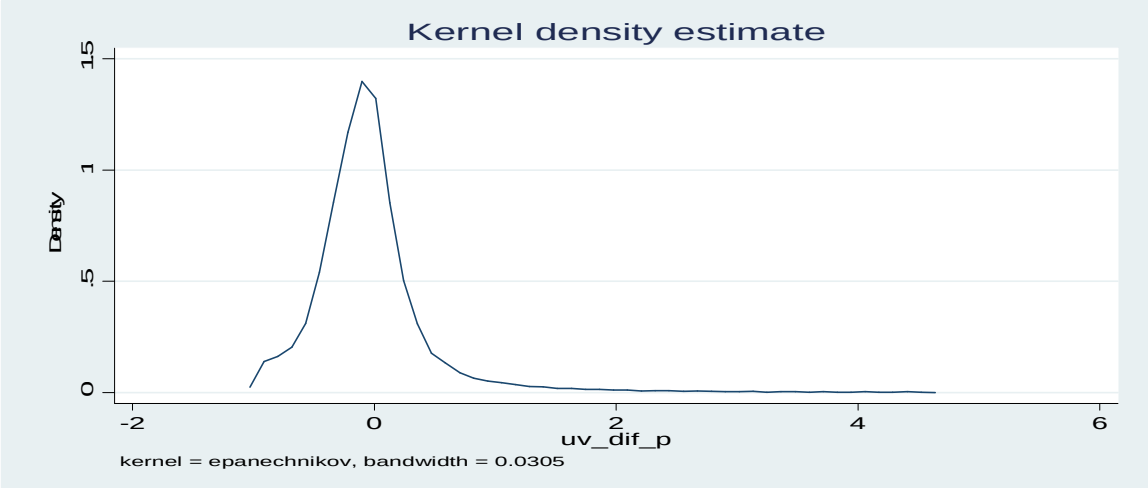
[6] This is a total of 15,433 products.

eligible for preferential treatment (a total of more than 50,000 cases). This allows us to calculate the percentage difference between average unit values as in equation (7).

$$uv_{it}\% = \frac{uv_{it}^{p} - uv_{it}^{mfn}}{uv_{it}^{mfn}} \qquad (7)$$

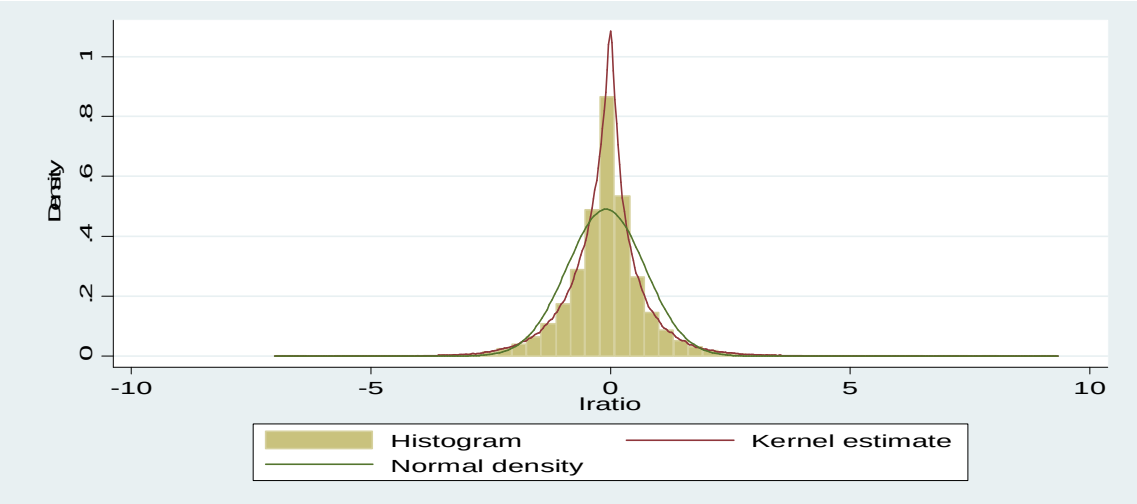
The distribution has a long right hand side tail, for this reason we drop those observations above the 99% percentile. Figure 5 plots the probability distribution function for this percentage difference. The average value is a positive 25%, however, this result is largely affected by the long right hand side tail since more than 62% of the observations have negative percentage differences. This implies that most of the product/year average prices under MFN are larger than under the preferential scheme.

Figure 5 Probability density function for unit value percentage differences between preferential and MFN prices



The previous analysis shows that existing large differences between unit values within the same product may distort the use of average prices between countries. In addition, many preferential exports enjoy minimal tariff margins. For this reason, and in order to minimise any difference related to other factors, we compute the log price ratio for the periods where both preference utilisation and non-utilisation are observed for the same country and year. Figure 6 plots the probability distribution function of this ratio. A value of zero corresponds to the case when both prices are equal. The probability distribution function (*pdf)* is slightly skewed to the right, however, the average value for the log ratio of -0.092 indicating higher probability that prices when preferences are non-utilised are larger than preferential prices. This is reflected in a longer tail to the right of the distribution. In general, however, this univariate analysis indicates similar recurrence of cases where prices under utilisation are both smaller (55%) and larger (45%) than non-utilisation prices.

Figure 6 Probability distribution function for log ratio of prices



The main problem with univariate analysis is the lack of control for other factors that may explain prices, such as market power or the type of product. As a result, identification of the true impact of the tariff margin on prices requires control of these other factors and estimation of reduced form equations as in (3) and (4).

6. Econometric Analysis

Export Prices

We start by estimating equation (2) for export prices in order to analyse the degree of pass-through from tariffs to export prices. The main challenge of the estimations is how to deal with the three way error component in (2) and (3). We then estimate the reduced form equation by OLS with robust standard errors clustered for each variety. The results of different specifications are reported in Table 3 columns (1) to (3). Richer and more distant countries, and countries with larger market share tend to have higher export prices. In addition, countries show a positive response to increases in average prices. Regarding the main variable of interest, the tariff pass-through, the estimates suggest a large positive pass-through between 0.5 and 0.7. Columns (2) and (3) of Table 3 add the tariff margin to the specification and obtain roughly full pass-through from tariff to price margins. Finally, column (3) finds a positive impact of average distance on prices.

The main problem with OLS estimates is the fact that they are biased if λ_{ij} is correlated with the dependent variables. In order to correct for this potential correlation we first use variety (product country pair) fixed effects (columns (4) and (5)). The significant change in the coefficients indicates the existence of correlation between the λ_{ij} and the dependent variables. The coefficients show the same expected sign but lower magnitude. However, interestingly now the pass-through from tariffs to export prices is reduced significantly and when we add the margin becomes negative. A negative pass-through is consistent with the existence of a price margin for preferential exporters. However, in this case we should expect a positive pass-through from the margin.

Table 3 Export Price Specification

	(1) OLS1	(2) OLS2	(3) OLS3	(4) FE1	(5) FE2	(6) FELSDV1	(7) FELSDV2
Share	0.0058***	0.0049***	0.0051***	0.0399***	0.0400***	0.0127***	0.0127***
	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0006)	(0.0003)	(0.0003)
Average price	0.9329***	0.9345***	0.9321***	0.4714***	0.4720***	0.6760***	0.6750***
	(0.0008)	(0.0008)	(0.0008)	(0.0018)	(0.0018)	(0.0020)	(0.0020)
Tariff	0.4839***	0.6958***	0.6000***	0.2282***	-0.2336***	-0.2115***	-0.3755***
	(0.0172)	(0.0196)	(0.0193)	(0.0177)	(0.0493)	(0.0183)	(0.0537)
GDP_cap	0.1063***	0.1100***	0.1152***	-0.0547***	-0.0567***	0.0928***	0.0930***
	(0.0008)	(0.0008)	(0.0008)	(0.0124)	(0.0125)	(0.0132)	(0.0132)
Margin		0.9983***	1.1875***		-0.5195***		-0.1858***
		(0.0243)	(0.0255)		(0.0513)		(0.0558)
Distance			0.0600***				
			(0.0012)				
2003	-0.0050**	-0.0048*	-0.0057**	-0.0308***	-0.0308***	-0.0218***	-0.0220***
	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0023)	(0.0023)
2004	-0.0141***	-0.0134***	-0.0191***	-0.0328***	-0.0331***	-0.0343***	-0.0345***
	(0.0021)	(0.0021)	(0.0021)	(0.0022)	(0.0022)	(0.0025)	(0.0026)
2005	-0.1700***	-0.1632***	-0.1869***	-1.2453***	-1.2444***	-0.7792***	-0.7819***
	(0.0030)	(0.0030)	(0.0031)	(0.0049)	(0.0050)	(0.0055)	(0.0055)
2006	-0.1656***	-0.1589***	-0.1817***	-1.2117***	-1.2109***	-0.7617***	-0.7644***
	(0.0030)	(0.0030)	(0.0030)	(0.0051)	(0.0051)	(0.0056)	(0.0057)
2007	-0.0125***	-0.0104***	-0.0311***	0.0088*	0.0088*	-0.0163***	-0.0165***
	(0.0024)	(0.0024)	(0.0024)	(0.0035)	(0.0035)	(0.0039)	(0.0039)
2008	-0.0129***	-0.0104***	-0.0314***	0.0239***	0.0236***	-0.0091**	-0.0094***
	(0.0024)	(0.0024)	(0.0024)	(0.0038)	(0.0039)	(0.0042)	(0.0043)
Constant	0.9869***	1.0522***	1.5778***	1.4979***	1.5411***		
	(0.0073)	(0.0075)	(0.0127)	(0.1028)	(0.1032)		
Obs.	1489595	1481623	1481524	1489595	1481623		
R-squared	0.8235	0.8235	0.8242	0.7726	0.7721		

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

In order to further control for the three way error term, we use the fixed-effects least square dummy variables (FELSDV) methodology proposed by Andrews et al. (2006). The main assumption is to decompose λ_{ij} in product fixed effects and country dummies, and to assume one error term ε_{ijt} that is N~$(0,\sigma^2)$ as in equation (8):

$$p_{ijt} = \beta_0 + \beta_1 \bar{p}_{jt} + \beta_2 \phi_{ijt} + \beta_3 \tau_{ijt} + \beta_4 \frac{(1+\tau_{jt}^{mfn})}{(1+\tau_{ijt})} + \varphi_i + \eta_j + \gamma_t + e_{ijt} \qquad (8)$$

Due to the computational difficulties and the large number of parameters to estimate we use the STATA command FELSDV developed by Cornelissen (2008). The results are reported in columns (4) and (5) of Table 3. We reject the hypothesis that both product and country effects are zero. The results again provide a negative and low pass-through from tariffs, as well as margins.

A final robustness check is related to the potential simultaneity between average prices and export prices, especially in products with a low number of exporters. We re-estimate the same specifications but using the lagged average price value as instrument. The results are reported in Table 4 and are very similar to those in Table 3, but with a reduction on the pass-through from tariffs to prices. Again, the pass-through becomes negative when we control for variety, country and product fixed effects.

Price Margins

In order to properly identify the degree of pass-through from preferential margins to prices, we estimate equation (4) using the price ratios for those country/product/years where we observe both utilisation and non-utilisation of preferences. Rather than considering each export flow according to the tariff regime paid, we collapse the sample by each product/exporter/year flow. We then define the price ratio as the logarithm of the unit value of product *i* from exporter *j* and year *t* under preferential regime divided by the unit value from the same product/exporter/year when preferences are not utilised.

$$p_{ijt}^{ratio} = \ln\left(\frac{uv_{ijt}^{pref}}{uv_{ijt}^{non-uti}}\right) \qquad (9)$$

For a total of 247,923 cases, we are able to calculate the price ratio. Table 5 shows the results from the estimates. Columns (1) and (2) show OLS estimates with clustered errors for each country/product pair. Countries with larger market shares and higher income per capita and, therefore, with higher bargaining power, tend to obtain higher price margins. In addition, the main variable of interest - the tariff margin -is fully transmitted to the price ratio with a pass-through coefficient of around 1. The specification in column (2) attempts to further control for market structure issues by adding a dummy with value 1 according to whether the product is differentiated in terms of Rauch's (1999) classification, and the average import demand elasticity in the EU as calculated by Kee et al. (2009) at HS-6 level. The results show that price ratios tend to be larger for differentiated products, with more room, for price differentiation, and are lower for more demand elastic goods, although the last coefficient is only significant at 5% level. We also use an interactive dummy to measure whether there is a differential impact of the tariff margin for those flows that used the GSP or EBA regime vs. those using the Cotonou Agreement or any other FTAs. The coefficient associated to the interactive dummy is negative, suggesting a lower pass-through for the GSP/EBA regime.

Table 4 Export Price Specification Lagged Price

	(1) OLS1	(2) OLS2	(3) OLS3	(4) FE1	(5) FE2	(6) FELSDV1	(7) FELSDV2
Share	0.0018***	0.0013**	0.0014**	0.0329***	0.0329***	0.0081***	0.0082***
	(0.0004)	(0.0004)	(0.0004)	(0.0007)	(0.0007)	(0.0003)	(0.0003)
lag_price	0.8879***	0.8892***	0.8871***	0.0150***	0.0147***		
						0.0305***	0.0294***
	(0.0010)	(0.0010)	(0.0010)	(0.0020)	(0.0021)	(0.0024)	(0.0024)
Tariff	0.2743***	0.4348***	0.3459***	0.1746***	-0.5309***	-0.2838***	-0.9028***
	(0.0195)	(0.0219)	(0.0217)	(0.0206)	(0.0583)	(0.0215)	(0.0647)
GDP_cap	0.1215***	0.1242***	0.1289***	-0.0196	-0.0210		
						0.1519***	0.1516***
	(0.0009)	(0.0009)	(0.0009)	(0.0161)	(0.0162)	(0.0173)	(0.0174)
margin		0.7602***	0.9336***		-0.7826***		-0.6780***
		(0.0269)	(0.0280)		(0.0605)		(0.0669)
distance			0.0565***				
			(0.0014)				
2003	-0.0847***	-0.0873***	-0.0681***	2.1802***	-0.1213***		
	(0.0027)	(0.0027)	(0.0027)	(0.0057)	(0.0042)		
2004	-0.0197***	-0.0220***	-0.0076**	2.1820***	-0.1199***	-0.0097***	-0.0100***
	(0.0027)	(0.0027)	(0.0027)	(0.0053)	(0.0036)	(0.0025)	(0.0025)
2005	-2.2792***	-2.2792***	-2.2766***	-0.0900***	-2.3924***	-2.2762***	-2.2772***
	(0.0028)	(0.0028)	(0.0028)	(0.0051)	(0.0031)	(0.0030)	(0.0030)
2006	-0.2334***	-0.2311***	-0.2325***		-2.3031***	-2.1567***	-2.1603***
	(0.0036)	(0.0036)	(0.0036)		(0.0056)	(0.0065)	(0.0066)
2007	2.0396***	2.0421***	2.0379***	2.3126***	0.0102		
						0.1529***	0.1497***
	(0.0036)	(0.0036)	(0.0036)	(0.0024)	(0.0053)	(0.0068)	(0.0068)
2008				2.3020***		0.1041***	0.1034***
				(0.0055)		(0.0047)	(0.0047)
Constant	-1.0086***	-1.0534***	-1.5674***	-0.1366	2.2192***		
	(0.0084)	(0.0087)	(0.0151)	(0.1358)	(0.1376)		
Observations	1182018	1176777	1176693	1182018	1176777		
R-squared	0.7943	0.7945	0.7951	0.7843	0.7840		

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

Table 5 Export Price Ratio Specification

	(1) OLS1	(2) OLS2	(3) FE1	(4) FE2	(5) FELSDV	(6) FELSDV
Share	0.0067***	0.0068***	0.0097***	0.0098***	0.0040***	0.0040***
	(0.0009)	(0.0009)	(0.0023)	(0.0023)	(0.0009)	(0.0009)
GDP capita	0.0435***	0.0397***	-0.0512	-0.0501	0.0257***	0.0265
	(0.0017)	(0.0020)	(0.0471)	(0.0471)	(0.0415)	(0.0416)
Tariff margin	1.0141***	1.1502***	0.8141***	0.8743***	0.1485***	0.1674*
	(0.0389)	(0.0439)	(0.1533)	(0.1605)	(0.0749)	(0.0774)
Tariff margin*GSP/EBA		-0.5125***		-0.2194		-0.1029
		(0.0723)		(0.1726)		(0.1071)
Differentiated product		0.0259***				
		(0.0047)				
Import demand elasticity		-0.0008*				
		(0.0004)				
2003	0.0262***	0.0265***	0.0295***	0.0294***	0.0241***	0.0241***
	(0.0048)	(0.0051)	(0.0054)	(0.0054)	(0.0056)	(0.0056)
2004	0.0194***	0.0196***	0.0296***	0.0294***	0.0213***	0.0212**
	(0.0054)	(0.0056)	(0.0071)	(0.0071)	(0.0069)	(0.0069)
2005	0.0309***	0.0311***	0.0355***	0.0352***	0.0274***	0.0272**
	(0.0059)	(0.0062)	(0.0089)	(0.0089)	(0.0085)	(0.0085)
2006	0.0282***	0.0287***	0.0245*	0.0241*	0.0135***	0.0133
	(0.0061)	(0.0064)	(0.0107)	(0.0107)	(0.0100)	(0.0100)
2007	0.0430***	0.0440***	0.0488***	0.0484***	0.0333***	0.0331**
	(0.0061)	(0.0065)	(0.0126)	(0.0126)	(0.0116)	(0.0116)
2008	0.0546***	0.0550***	0.0671***	0.0667***	0.0472***	0.0470***
	(0.0062)	(0.0066)	(0.0141)	(0.0141)	(0.0129)	(0.0129)
Constant	-0.4895***	-0.4765***	0.2920	0.2843		
	(0.0148)	(0.0175)	(0.3747)	(0.3748)		
Observations	244442	222061	244442	244442	244442	222061
R-squared	0.0088	0.0095	0.0009	0.0009		
Number of variety			98153	98153		

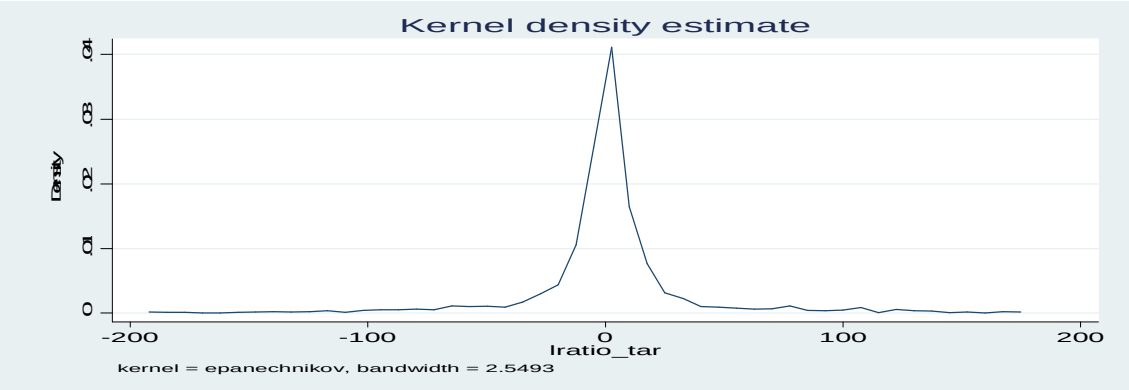
Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

In order to control for variety specific elements, specifications in columns (3) to (6) use variety fixed effects and FELSDV with both product and exporter dummies. For the fixed effects specification, the results are similar, although GDP per capita becomes statistically not significant. The estimated tariff margin pass-through is still large and positive (0.8) for the FE specifications. On the other hand the FELSDV specification reduces considerably the pass-through to 0.15. In addition, once controlled for variety, product and country specific elements, the interactive tariff margin GSP/EBA dummy coefficient becomes statistically not significant. The results still show a very low R^2, indicating lack of explanatory power for price ratio variations. This is probably the result of not having information on variety costs, which is likely to be the main determinant of prices and their variation across varieties.

The estimates above indicate the average transmission from tariff to price margins. In order to analyse product dynamics we re-estimate equation (4) product by product for those products with more than 50 observations during the sample period, controlling for country fixed effects and year dummies. This implies re-estimating equation (4) for 1,425 products. However, only 634 products have any variation in the tariff margin that allows estimating the tariff margin coefficient. Figure 7 shows the probability distribution function for the estimated coefficients excluding the 1% extreme values at both tails. The average pass-

through excluding 1% outliers is 1.4. However, this result is dominated by the presence of long symmetric tails.

Figure 7 Probability distribution function tariff margin pass-through coefficient by product



We also re-estimate equation (4) correcting for product fixed effects for each country with data available and more than 50 observations. Table 6 shows the estimated coefficient for the ten countries with larger and smaller estimated pass-through.

Table 6 Countries with Higher/Lower Estimated Margin Pass-through

	Estimated Pass-through		Estimated Pass-through
Panama	-273.40	Jordan	5.88
Honduras	-106.90	Macao	6.50
Sierra Leone	-78.60	Iran	7.30
El Salvador	-75.95	Belarus	9.01
Gambia	-22.58	Paraguay	10.33
Uruguay	-18.32	Ukraine	10.78
Moldova	-17.94	Fiji	12.90
Nepal	-17.51	Yemen	13.40
Gabon	-16.13	Nicaragua	78.90
Senegal	-15.09	Oman	227.00

Source: Author's own estimates

As suggested above, the results for the price ratio specification are likely to experience sample selection bias from reducing our sample to those observations where both utilisation and non-utilisation are observed. For this reason, we need to implement a selection procedure. We follow Bourguignon et al. (2007) and estimate a multinomial Logit model for the different utilisation alternatives. Concretely, we estimate the following equation, where Y_i is a discrete variable with value 0 to 3 according to whether a trade flow is only MFN eligible (regime 0), preferences are fully utilised (regime 1), preferences are non-utilised (regime 2), or both (regime 3), which is the regime where the price ratio can be calculated. The reason to consider regime 3 as a separate regime is the need to generate specific correction for selectivity terms for this regime.

$$Y_{ijt}^{*} = \beta x_{ijt} + \varepsilon_{ijt} \; for Y = 0,1,2,3 \qquad (10)$$

$$P_{ijt}^{*} = \beta x_{ijt} + u_{ijt}$$
$$P = P^{*} if Y = 3$$

The interpretation of the estimated coefficients needs to be understood as the impact of each variable with respect to the baseline category, MFN eligibility. In order to explain the different utilisation regimes, we use the tariff paid, the MFN tariff for that product and period, an index that measures RoO rigidity (Cadot el al. 2006), a dummy variable with value one if the good is homogenous according to Rauch's classification and GDP per capita.

The estimated coefficients need to be interpreted carefully due to the specific split of tariff regimes. This is confirmed by the Hausman test for Independence of Irrelevant Alternatives (IIA) (Hausman, 1978) which indicate large differences when omitting regime 1, and, therefore, the fact that different regimes may not be independent. It is likely that a nested structure considering eligibility and preference utilisation separately would be more appropriate for the different alternatives. Nevertheless, this would not allow us to compute the specific selection terms, which are the objective of this first stage.

Table 7 shows the average marginal effects of the multinomial Logit estimates. Fixed effects are not defined for multinomial Logit and selection. For this reason, we estimate the model considering only time dummies and not variety effects. Lower paid tariffs and higher MFN tariffs (higher tariff margins) increase the probability of preference eligibility, used or not used, *vis-à-vis* MFN eligibility. Clearly, all products without preferential access imply zero margins. Homogenous goods according to Rauch's classification are less likely to being eligible for preferences. Income per capita reduces both, preference eligibility and utilisation, since richer countries are less likely to receive preferences. Interestingly, however, it increases the likelihood of both utilisation and non-utilisation occurring *vis-à-vis* MFN eligibility. Finally, stringent RoOs reduce the probability of utilisation and increase the probability of non-utilisation *vis-à-vis* MFN eligibility. These coefficients are difficult to interpret, since we would expect the opposite sign. However, they should be compared with the odds of being in the MFN regime. It is likely that RoOs are more stringent on those product lines where there is more preference use than on mainly MFN eligible lines.

The selection model allows us to compute the different selection terms. We use Bourguignon et al. (2007) methodology and estimate the price ratio equation correcting for selection using the command selmlog available in STATA and developed by the authors. Column (1) estimates Dubin-McFadden (1984) correction method, column (2) relaxes the assumption all correlation coefficients sum-up to zero, and column (3) estimates the variant version of Dubin-McFadden (1984) suggested by Bourguignon et al. (2007).

Table 8 shows the results of the estimates. The selection coefficients are statistically significant indicating the impact of unobserved components and the fact that OLS estimates are inconsistent. This is translated in a reduction in the tariff margin pass-through, which is halved to 0.37-0.5. The selection terms m_i for regimes i=0,1,2,3 are mostly negative, indicating price ratios are downward biases because observations with better unobservable characteristics are less likely to be in the utilisation and non-utilisation regime.

Table 7 Multinomial Logit for Selection. Average Marginal Effects

	(1) utilisation	(2) Non-utilisation	(3) Both utilisation and non-utilisation
Tariff	-0.6723***	-0.0501***	-0.0466***
	(0.1829)	(0.0021)	(0.0053)
MFN tariff	1.5804***	0.0067	0.2607***
	(0.1830)	(0.0091)	(0.0098)
GDP capita	-0.0431***	-0.0024***	0.0044***
	(0.0002)	(0.0002)	(0.0002)
RoO index	0.0038***	-0. 0032***	0.0018***
	(0.0002)	(0.0002)	(0.0002)
homogenous	-0.0469***	-0.0166***	-0.0145***
	(0.0013)	(0.0015)	(0.0016)
2003	-0.0030**	-0.0013	0.0061***
	(0.0011)	(0.0009)	(0.0010)
2004	-0.0146***	0.0086***	-0.0113***
	(0.0011)	(0.0010)	(0.0010)
2005	-0.0488***	0.0228***	-0.0249***
	(0.0010)	(0.0010)	(0.0010)
2006	-0.0445***	0.0269***	-0.0307***
	(0.0011)	(0.0010)	(0.0010)
2007	-0.0410***	0.0188***	-0.0228***
	(0.0011)	(0.0011)	(0.0011)
2008	-0.0406***	0.0225***	-0.0259***
	(0.0011)	(0.0011)	(0.0011)
Observations	1185172		
Pseudo R2	0.476		
log-likelihood	-791867		

*** p<0.001, ** p<0.01, * p<0.05

In conclusion, the estimates suggest that preference margins are transmitted to exporters who capture part of the preference rent. However, the degree of pass-through is significantly reduced when we control for potential sample selection.

7. Conclusions

This paper analyses empirically the possibility of an additional benefit of preferential trade regimes on exporters, the appropriation of tariff preference rents induced by preference margins. We find in line with the literature that there is a significant number of cases where preferences are not utilised and eligible export flows for preferences pay the full MFN tariff. We also observe very large differences within prices of the same CN-10 digits product classification. On average, the standard deviation of unit values within product in the same year is 68% of the estimated mean. Regarding preference margins, we find that 67% of trade flows to the EU market from 2002 to 2008 are done at zero MFN rates (no preference margin), and only 31.7% of the flows enjoyed a positive preference margin on average. From these flows with positive margin, once excluded outliers, the average is equivalent to around 5% tariff difference.

Despite large differences in prices within product categories we estimate the impact of tariffs on export prices. We find that once we control for variety effects, tariffs paid tend to be negatively correlated with export prices, which is consistent with a positive price margin.

Table 8 Export Price Ratio Specification with Multinomial Selection

	(1) Dubin	(2) Dubin2	(3) Bourguignon
GDP capita	0.0665***	0.0730***	0.0764***
	0.0021)	0.0023)	0.0025)
Market share	0.0049***	0.0051***	0.0048***
	0.0007)	0.0007)	0.0008)
Preference margin	0.3674***	0.4850***	0.5096***
	0.0493)	0.0521)	0.0521)
2003	0.0420***	0.0489***	0.0549***
	0.0057)	0.0057)	0.0062)
2004	-0.0081	-0.0242**	-0.0292***
	0.0068)	0.0071)	0.0076)
2005	-0.0261**	-0.0617***	-0.0743***
	0.0101)	0.0113)	0.0124)
2006	-0.0469***	-0.0896***	-0.1053***
	0.0118)	0.0133)	0.0147)
2007	-0.0136	-0.0453***	-0.0575***
	0.0096)	0.0106)	0.0117)
2008	-0.0098	-0.0462***	-0.0597***
	0.0106)	0.0118)	0.0129)
m0	0.8980***	-0.4255*	-2.1405***
	0.1168)	0.2217)	0.2907)
m1	-0.5786***	-1.0315***	-1.9509***
	0.0448)	0.0785)	0.1431)
m2	-0.5253***	-1.4328***	-2.4956***
	0.0966)	0.1613)	0.2403)
m3		0.0897**	-0.2517***
		0.0329)	0.0574)
Constant	-1.1971***	-1.7968***	-1.9857***
	0.0931)	0.1263)	0.1333)
Sigma2	1.0954	3.1236	2.9443
rho0	1.1004	-0.3088	-1.2475
rho1	-0.7091	-0.7486	-1.1370
rho2	-0.6438	-1.0398	-1.4544
rho3		0.0651	-0.1467
Observations	237210	237210	228687
R2	0.0117	0.0119	0.012

*** p<0.001, ** p<0.01, * p<0.05

We finally estimate a direct specification linking tariff margins with price margins. We find a consistent positive full pass-through from tariff to price margins. This pass-through, however, is substantially reduced when we consider variety effects and when we control for potential sample selection. The pass-through is estimated to a range between 0.16 and 0.5, depending on whether product and country effects are considered or selection. A common pattern of the estimates is the low R^2, likely the result of the lack of product and country specific cost data.

In conclusion, the main findings of the paper show that preference margins induce a preference rent, which is partly appropriated by preferential exporters.

References:

Alchian, A. A. and Allen, W. R. (1964) *University Economics*, Belmont, CA: Wadsworth Publishing Company

Alfieri, A. and Cirera, X. (2007) 'Unilateral Trade Preferences in the EU: An Empirical Assessment for the Case of Mozambican Exports', DNEAP Discussion Paper 60E, Maputo (Mozambique)

Andrews, M.; Schank, T. and Upward, R. (2006) 'Practical fixed-effects estimation methods for the three-way error-components model', *Stata Journal* 6: 461-481

Baldwin, Richard. and Harrigan, James. (2007) *Zeros, Quality and Space: Trade Theory and Trade Evidence,* NBER Working Papers 13214, National Bureau of Economic Research

Bernard, A. B.; Jensen, J. B.; Redding, S. J. and Schott. P. K. (2007) 'Firms in International Trade', *Journal of Economic Perspectives*, 21.3: 105-130

Bourguignon, F.; Fournier, M. and Gurgand, M. (2007) 'Selection Bias Corrections Based On The Multinomial Logit Model: Monte Carlo Comparisons', *Journal of Economic Surveys* 21.1: 174-205

Cadot, O.; Carrere, C.; De Melo, J.; and Tumurchudur, B. (2006) 'Product-specific rules of origin in EU and US preferential trading arrangements: an assessment', *World Trade Review* 5.2: 199-224

Campa, J. M. and Goldberg, L. S. (2006) *Pass Through of Exchange Rates to Consumption Prices: What has Changed and Why?*, NBER Working Papers 12547, National Bureau of Economic Research

Chang, W. and Winters, L. A. (2002) 'How Regional Blocs Affect Excluded Countries: The Price Effects of MERCOSUR', *The American Economic Review* 92.2: 889-904

Cornelissen, T. (2008) 'The Stata command felsdvreg to fit a linear model with two high-dimensional fixed effects', *Stata Journal* 8: 170-189.

Görg, H.; Halpern, L. and Muraközy, B. (2010) *Why do within firm-product export prices differ across markets?, CEPR Discussion Papers* 7708

Hadi, A. S. (1992), 'A New Measure of Overall Potential Influence in Linear Regression', *Computational Statistics and Data Analysis* 14: 1- 27

Hallak, J. C. and Sivadasan, J. (2009) *Firms' Exporting Behavior under Quality Constraints*, NBER Working Papers 14928, National Bureau of Economic Research

Hausman, J.A. (1978) 'Specification tests in econometrics', *Econometrica* 46: 1251–1271

Heckman, J. J. (1979) 'Sample Selection Bias as a Specification Error', *Econometrica* 47.1: 153-161

Hellerstein, R. (2006) *A Decomposition of the Sources of Incomplete Cross-Border Transmission,* Federal Reserve Bank of New York. Staff Reports 250

Hummels, D. and Skiba, A. (2004) 'Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen Conjecture', *Journal of Political Economy* 112.6: 1384-1402

Kee, H. L.; Nicita, A. and Olarreaga, M. (2009) 'Estimating Trade Restrictiveness Indices', *Economic Journal* 119:534: 172-199

Kugler. and Verhoven. (2008)

Melitz, M. J. (2003) 'The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity', *Econometrica* 71.6: 1695-1725

Olarreaga, M. and Özden, C. (2005) 'AGOA and Apparel: Who Captures the Tariff Rent in the Presence of Preferential Market Access?', *World Economy* 28.1: 63-77

Özden, C. and Sharma, G. (2004) *Price Effects of Preferential Market Access: the Caribbean Basin initiative and the apparel sector,* Policy Research Working Paper 3244: World Bank

Rauch, J. (1999) ‘Networks Versus Markets in International Trade’, *Journal of International Economics* 48: 7-35

Schott, P. K. (2004) ’Across Product versus Within Product Specialization in International Trade‘, *Quarterly Journal of Economics* 647-678.