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ABSTRACT

Product Specific Rules of Origin in EU and US Preferential Trading Agreements: An Assessment*

Building on earlier work by Estevadeordal, we construct a synthetic index (R-index) intending to capture the restrictiveness on market access due to product specific rules of origin (PSRO) that apply at the tariff-line level. The R-index is constructed for rules of origins under NAFTA and under the single list applying to PANEURO, the new regime applying to all EU preferential trade agreements. The R-index highlights how identical PSRO have different impacts across countries, and how the complexity of PSRO varies across sectors. Having controlled for the extent of tariff preference at the tariff-line level, the R-index contributes to account for differences in utilization rates at the tariff line level. The index is then used to assess composition effects across countries subjected to some set of PSRO and to compute estimates of the compliance costs associated with rules of origin under both regimes.

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Keywords: costs, NAFTA, PANEURO and rules of origin

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1 Introduction

Notifications of preferential trading arrangements (PTAs) to the WTO secretariat indicate that all but twelve countries (small islands and municipalities except for Mongolia) belong to at least one PTA. According to a recent tally (World Bank 2005, table 2.1), the average number of PTAs per country is 6, with 45 developing countries having signed bilateral trading arrangements with a Northern partner, and of the 109 North-South (N-S) PTAs, 90 having been created since 1990. A hub-and-spoke trading system is developing in which the partners with the largest markets (the EU and the US) sign individual (or group) Free Trade Agreements (FTAs) with a range of peripheral countries. Current examples include the ongoing negotiations for the Economic Partnership Agreements (EPAs) and those to be scheduled for a Free Trade Area of the Americas (FTAA). At issue is how much market access Southern partners will get to the Northern partner. Next to these, Northern countries also have in place the Generalized System of Preferences (GSP) and more recently the Everything But Arms (EBA) and Africa Growth Opportunity Act (AGOA) initiatives of the EU and US respectively.

Reciprocity (as in the FTAs) or not (as in the GSP and other initiatives), these PTAs being less than a Customs Union, establishing origin is key to the implementation of the agreement, since it is how imports are prevented from entering the preferential area through the low-tariff partner, a situation that might be highly liberalizing in the absence of Rules of Origin (RoO) if partners were to compete for tariff revenue (see Richardson, 1995). Neglected until recently, RoO are attracting increasing attention, both theoretically and

empirically.[1] The theoretical literature is slowly leading to a consensus on the effects of RoO, several of these going beyond the avowed intent of conferring origin.[2] The empirical literature is more scattered, partly because the necessary data on utilization rates of origin are only starting to become available, and are also difficult to interpret (see below). Because of the complexity of the RoO (both regime-wide and product-specific RoO (PSRO) but mostly because of the latter), after controlling for the extent of preferential access, patterns of utilization rates show a great disparity across activities, partners, and PTAs.

This complexity in the patterns of uptake of preferences makes it extremely difficult to assess how much market access Southern partners are getting from these PTAs. At the same time, knowing more about the extent of effective market access is of significance for the evolving multilateral trade negotiations, since one of the objectives of the Doha Round is to provide increased market access for developing countries, and LDCs in particular.[3]

This paper describes and evaluates the PSRO governing the PTAs entered by the two leading Northern partners, the EU and the US. It draws on utilization rate data on Mexican exports to the US in 2001 and similar data for ACP exports to the EU in

[1] Early theoretical contributions include Krueger (1995), Krishna and Krueger (1995), and previous efforts at quantification include Herin (1986) and Koskinen (1983) for EFTA, Estevadeordal (2000), Carrère and de Melo (forthcoming), and Anson et al (forthcoming) for NAFTA. Brenton and Imawaga (2004) survey the debate and policy implications of RoO, and Cadot et al. eds. (forthcoming) assembles recent contributions.
[2] The main effects are: (i) raising the costs of production; (ii) redirecting investment towards the partners to satisfy RoO; (iii) trade suppression (i.e. changing trade patterns within the zone to satisfy RoO)
[3] In view of these objectives, it is worth recalling that it is at the insistence of industrialized countries that harmonization of RoO was not put on the agenda of the current round of multilateral trade negotiations. For further discussion, see Brenton and Imagawa (2004).

2002.[4] More specifically, the paper makes two contributions. First, we construct an R-index of restrictiveness of PSRO along the lines first proposed by Estevadeordal (2000) in the case of NAFTA, modifying it and extending it for the EU single-list (SL) set in place under PANEURO. This synthetic R-index is then used to compare PSRO under NAFTA and PANEURO.

To anticipate our main conclusions, first, we show in the case of the PANEURO that the R-index is useful to summarize how countries are differently affected by the same set of RoO because of their different export baskets to the EU. Second, we show that the R-index is a relatively reliable statistic in the sense that, subject to caveats, after controlling for the extent of tariff preference at the tariff-line level, it accounts for differences in utilization rates at the tariff line level. Finally, together with utilization rates, the index can be used to estimate total compliance costs of PSRO.

The remainder of the paper is organized as follows. Section 2 contrasts PSRO under PANEURO and NAFTA and discusses the construction of a restrictiveness index (R-index) at the tariff line level. Section 3 then applies this index to describe and compare the two regimes for broad product categories. Having checked that the R-index is indeed correlated with utilization rates after having controlled for preference rates, Section 4 uses the distribution of R-index values to non-parametric estimates of upper and lower bounds

[4] The implicit assumption here is that the PANEURO and NAFTA regimes will survive pretty much unaltered in the negotiations underway for an FTAA and for the EPAs. Estevadeordal and Suominen (forthcoming) describe in great detail the complexities of RoO across PTAs. Cadot, de Melo and Tumurchudur (2005) use the approach in this paper to compare AGOA and EBA ROO for those ESA countries. Compared with EBA, AGOA has less product coverage, but simpler ROO, since a single criterion of 35% regional value content is used to confer origin outside of textiles, while for textiles and apparel (T&A) a yarn forward rule which would be the strictest criterion under the observation rule adopted in this paper. They conclude that EBA and AGOA give similar treatment, except for T&A for non-LDCs where AGOA PSRO are stricter.

of total compliance costs associated with rules of origin. Section 5 concludes. An appendix describes in detail the observation rule used to construct the R-index.

2. The NAFTA and PANEURO regimes

Virtually all PTAs have regime-wide Roo and PSRO. We describe briefly those rules in the case of NAFTA and PANEURO, starting with regime-wide rules.

Regime-wide rules. These usually include: (i) a ***de minimis*** (or tolerance) criterion which stipulates a maximum percentage of non-originating materials that can be used without affecting the origin of the final product; (ii) cumulation[5]; (iii) roll-up[6]; (iv) duty-drawback[7];(v) certification method. How these

[5] Cumulation allows PTA producers to import non-originating materials from other PTA member countries without affecting the final product's originating status. Three types of cumulation rules are distinguished: bilateral, diagonal and full cumulation. Bilateral cumulation is most common and applies to trade between two partners in a PTA. It stipulates that producers in country A can use inputs from country B without affecting the final good's originating status provided that the inputs are themselves originating (i.e. provided that they themselves satisfy the area's ROOs). Under diagonal cumulation (the basic principle of the EU's PANEURO system), countries tied by the same PTA can use materials that originate in ***any*** member country as if the materials were originating in the country where the processing is undertaken. Finally, under full cumulation, all stages of processing or transformation of a product within the PTA can be counted as qualifying content regardless of whether the processing is sufficient to confer originating status to the materials themselves. It is easy to show that full cumulation allows for greater fragmentation of the production process than the more commonly used bilateral and diagonal cumulation, and hence is less restrictive.

[6] The absorption or roll-up principle allows non-originating materials which have acquired origin by meeting specific processing requirements to maintain this origin when used as input in a subsequent transformation. In other words, the non-originating materials are no longer taken into account in calculating value added. The roll-up or absorption principle is used in most PTAs (in particular the EU's GSP and Cotonou), although a few have exceptions for the automotive sector.

[7] Duty drawbacks are refunds to exporters of tariffs paid on imported intermediate inputs. Many PTAs, especially in the Americas, mandate the elimination of duty-drawback schemes for exports to partner countries, on the ground that a duty drawback claimed by a producer in A to export to B would put that producer at a competitive advantage compared to domestic producers in B given that the A-producer already benefits from the elimination of intra-bloc tariffs. The elimination of duty drawbacks as

regime-wide rules differ between NAFTA and PANEURO is described in table 1.

Table 1 here: Regime-Wide RoO in NAFTA and EU's GSP and Cotonou Agreements

Table 1 shows that even for regime-wide rules, there is an impression of 'made-to-measure', an expression first used by Johnson (1965) in describing the complexity of the tariff structures in developing countries. The table also shows that regime-wide rules differ across PTAs for the same Northern partner, confirming the hub-and-spoke characteristic of N-S PTAs. Also note the difference in certification methods between the EU and US PTAs: in the US PTAs, certification is easier to carry out, at least in principle, compared with the EU PTAs.

Product-specific RoO (PSRO). Estevadeordal (2000) proposed a synthetic index based on an observation rule to summarize the restrictiveness of a given PSRO. His ordinal index computed at the tariff line level, ranged from one (least restrictive) to seven (most restrictive), (i.e. $1 < R_i < 7$). His observation rule was based on the following two assumptions. The first is that the restrictiveness of a change of Tariff Classification (CTC) can be ranked in terms of its restrictiveness on the basis of the following observation: A change of classification at the chapter level (CC) has to be more difficult to satisfy than a change at the Heading (CH) level; likewise, a change at the heading level has to be stricter than at the subheading (CS) level, and a change at the subheading level more stringent than at the tariff line or item level (CI). This implies that

part of a PTA's formation can imply a cut in the profitability of final-good assembly for export to partner countries in the area, although tariff escalation, when present, already provides some protection for final-assembly operations (as it implies lower tariffs on intermediate goods than on final ones).

the following observation rule (larger values corresponding to more restrictiveness):

$$\Delta CC > \Delta CH > \Delta CS > \Delta CI$$

If a CTC is widely used in both NAFTA and PANEURO, in the majority of cases, it is almost always accompanied by other criteria to be met to confer origin. These include: (i) a value content (VC) criterion, widespread in the case of PANEURO and varying from 50% to 85% (under NAFTA only three values, of 50%, 55% and 60%) of materials having to originate in the preferential zone; (ii) technical requirements (TECH); exceptions (EXC); (iii) allowances (ALLOW) that relax the restrictiveness of obtaining origin, allowances being used only for PANEURO. All but allowances make it more difficult to satisfy origin, so the observation rule assigns higher values to the index resulting from the CTC when these other requirements are added on (and a lower value when there is an allowance).

Table 2 describes the distribution of the main PSRO at the tariff line level for NAFTA and PANEURO. The main difference between the two regimes is apparent from the distribution of single criteria: for PANEURO, 13% of tariff lines only rely on a VC criterion whereas for NAFTA 89% of tariff lines rely on a CTC or a single exception.

Insert table 2 here: Distribution of PSRO under NAFTA and PANEURO

A synthetic index, like the R-index developed by Estevadeordal and subsequently modified by Estevadeordal and Suominen (forthcoming) based on the principles described above, is arguably a useful way to summarize the complexities of PSRO evident from the entries in table 2. In the following, we

modify the R-index by taking into account the following considerations that apply mostly to the S-L under PANEURO. First, allowances are taken into consideration. Second, the "wholly-obtained" criterion which applies mostly to agricultural products (and is not present in NAFTA) should be given a low restrictiveness value since PSRO rarely bind for agricultural products. Third, in view of the large differences in allowances for the extent of non-originating inputs in PANEURO, it is plausible to assign a higher value for VC rules that require high values for intermediates originating regionally. Finally, we also code two other additional requirements under PANEURO and take into account the possibility of choice of PRSO given to exporters under the PANEURO S-L by assigning the lowest R-index value when exporters have a choice among alternative requirements to meet origin. When applicable to NAFTA PSRO, we recomputed the R-index accordingly. Details on the construction of the R-index (computed for 3555 tariff lines for NAFTA and 5595 tariff lines for PANEURO) are given in the annex.

The resulting ordinal R-index thus assigns a single number estimate to the restrictiveness of PSRO that must be negotiated to obtain origin. In addition to the inevitable arbitrariness involved in setting up the observation rule described in the annex, the R-index has other shortcomings. In particular, it does not control for the degree of preferences and for the characteristics of the different activities: satisfying a CTC involving a CH for intermediate activities is likely to be easier than if it is to be satisfied for a final good activity.

Before applying the R-index to describe the restrictiveness of PSRO, we describe its characteristics and, since it was constructed independently of tariff preferences, we compare R_i

values for both NAFTA and PANEURO regimes with the distribution of tariff preferences, where the tariff preferences, τ_i, are also defined at the tariff line level as follows:

$$\tau_i = \frac{t_i^{pref} - t_i^{mfn}}{1 + t_i^{mfn}} \qquad (0.1)$$

Insert Figure 1: Cumulative Distribution of Restrictiveness Index and preferences

Figure 1 describes the resulting distribution of R-index values computed for NAFTA and for PANEURO. The shapes of the two distributions are quite similar with the bulk of values in the 4 and 5 range. The major difference between the two histograms comes from the low index values (R_i=1) assigned to "wholly obtained" criterion used for PSRO for agricultural products under PANEURO.

Since tariff preferences are usually known when RoO are negotiated (preferences being equal to the MFN tariff since negotiated N-S PTAs are in effect FTAs except for some agricultural products), it is interesting to see whether values of the R-index are higher for sectors with tariff peaks (and hence lower for sectors with below-average tariffs). Table 3 compares average values of R_i and τ_i values, leaving out the middle third of the distribution of τ_i from the comparison.[8]

[8] In these comparisons, and all the following ones, only tariff lines with positive exports are considered and outlier observations have been removed. In the NAFTA case, 5 observations with $\tilde{\tau}_i > 100\%$ (and u_i=100%) were eliminated (3 belonging to Chapter 24 - Tobacco and 2 to Chapter 12 - Vegetables). In EU case, 88 observations were deleted (accounting for 0.02% of total trade to the EU). These are(preference rates in parenthesis): mushroom (HS 200310 -150%); garlic (HS 070320-100%); sugar (HS 170111-67%, HS170199-70%); tobacco (HS 240310-75%, HS 240399-42%, HS 240220-58%); alcohol (HS 220710-47%).

For both NAFTA and PANEURO, average R-index values are higher for tariff-peak sectors than for low-tariff sectors. That the R-index values and tariff preference values follow this pattern either confirms that the R-index values corroborate what is believed to be an accurate description of the restrictiveness of PSRO or, alternatively if one believes that the criteria underlying the observation rule are indeed accurate on average, then indeed PSRO are more restrictive in sectors with high tariff preferences, a result confirmed below with regressions at the tariff line level.

Insert table 3 here: PSRO Restrictiveness Index and Protection

The patterns in table 3 suggest that indeed, the political-economy of RoO-making may well be one in which the negotiation power of the Northern partner results in little market access to the Southern partner, i.e. leaves them on what Anson et al. (forthcoming) call their participation constraint, so that negligible extra market access is reaped from preferential market access. It would thus seem that for both PANEURO and NAFTA, the determination of PSRO is indeed, driven by a political-economy process.[9]

3. Applying the index: Composition effects across sectors and countries

Working at the section level (21 sectors), we use the R-index to indicate the importance of composition effects across countries and across activities for the 77 ACP countries benefiting from ACP preferences.[10] Figure 2 plots the ROO

[9] See Cadot et al. (forthcoming) for evidence in the case of NAFTA.
[10] In all the computations that follow we restrict our analysis to request for ACP treatment from ACP countries. We do this simply because this is the tariff regime requested in the majority number of cases, even though tariff-free under GSP (EBA) preferences would have given equal or greater market access. This request for sometimes less favorable preferences could

index value for the LDC (40 countries) and non-LDC (37 countries) group of ACP countries.

Insert figure 2 here: ACP average PANEURO R-index: LDCs vs. non-LDCs

Figure 2(a) reports simple (i.e. unweighted) figures. Departures from the 45^0 line are thus entirely due to aggregation effects, i.e. to the fact that not all product categories are exported for each group of countries. Note first that the R-index usually takes on higher values down the sector classification, i.e. for activities with increasing degrees of processing (e.g from live animals (1) to T&A (11). Since, roughly speaking, increasing numbers in that classification correspond to more round-about techniques of production (lower sectoral value-added ratios), it appears that PSRO rules become generally more restrictive for sectors requiring more processing. In a world of increasing verticalization of trade, and in which tariff escalation implies that protection (and hence tariff preferences) increase with the degree of processing, this pattern suggests that final goods producers in Northern countries lobby successfully to obtain restrictive PSRO for final goods (while at the same time using VC restrictions to prevent Southern producers from purchasing intermediates outside the zone). Overall, not surprisingly for this large sample of countries, composition effects are small since most observations are close to the 45^0 line (observations below the 45^0 line like sector 2 (vegetables) correspond to non-LDC specialization in activities with the corresponding R_i values). Thus, as a group,

be explained by slightly different regime-wide rules under both regimes. However it is most likely due to learning effects (recall that utilization data are for 2002, the first year that EBA was in full effect). Cadot, de Melo and Tumurchudur (2005) discuss reasons in the case of East and Southern Africa countries.

LDC and non-LDC interests appear to be equally affected by PSRO, at least at this level of aggregation.

The picture changes dramatically when one moves from the product composition to differences in the volume of exports within these sector categories. Table 2(b) gives the same information, but weighting each R_i value by the corresponding trade volume at the product line. Taking footwear and T&A as two examples, LDCs exports of footwear are relatively concentrated in product categories with stringent PSRO, while non-LDCs exports of T&A are concentrated in exports in product categories with stringent PSRO. Since the observations below the 45^0 line tend to be concentrated in sectors with high R-index values, the non-LDCs are relatively penalized. Note also that using trade-weights also alters the computed values of the R_i values. For instance, weighing by trade volumes cuts almost in half the R-index value for T&A for LDCs.

To sum up, figure 2 leads to three observations. First, R_i values tend to be higher for activities with greater processing (i.e. lower value added). Second, taking into account that preferential access is almost identical for LDCs and non-LDCs, insofar as trade volumes are indicators of countries interests in PSRO, LDCs and non-LDCs would have different interests in changes in PSRO rules. For example, the LDC [non-LDC] group would be more interested in a relaxation of PSRO in footwear [T&A]. Third, non-LDCs face restrictive PSRO in the sectors in which they have a revealed comparative advantage (in the sense of high export shares). If the R-index is an acceptable proxy of the costs of complying with establishing origin, as LDCs move up the ladder of comparative advantage, they will get less market access under the single-list PRSO.

Next, one may inquire further if North-South PTAs such as those entered into by the US and the EU are characterized by more restrictive PSRO in sectors with higher preference rates. Using trade weights and the same 21 sections as in figure 2, figure 3 plots the average restrictiveness value for section against the average preference margin.

Insert figure 3 here: Preferences and ROO across EU PTAs

The scatter plot shows a positive correlation between preferences and restrictiveness already noted in table 3. This is confirmed by the following regressions using all observations (section dummies not reported and t-statistics in parenthesis)

$$\underset{(0.86)}{\tau_i^{US}} = \underset{(4.14)}{0.01 + 0.005R_i^{US}} \; ; \bar{R}^2 = .31 \quad ; N = 3555$$

$$\underset{(8.26)}{\tau_j^{EU}} = \underset{(8.27)}{-0.01 + 0.004R_j^{EU}} \; ; \bar{R}^2 = .41, N = 19720$$

Both set of regressions confirm that the scatter plot pattern at the section level carries on at the tariff-line level. For both EU FTAs and NAFTA, higher preference rates are associated with higher R-index values.[11]

4. Correlates of utilization rates and non-parametric cost of compliance estimates.

As a second application, we use to the distribution of R-index values along with utilization rates to derive upper and lower bounds of compliance costs associated with rules of origin under PANEURO and NAFTA. Before carrying out this exercise, we

[11] Regressions use unweighted values. Using trade weights to compute an aggregate rate of protection raises two problems (see e.g. Trefler, 1993). First, since trade flows are endogenous, the resulting endogeneity bias will understate the extent of protection. Second, tariff lines are not equivalent because of domestic product specialization and demand effects. So using export weights introduces a bias, but accounts for the relative importance of products. Correlations using export weights (not reported here), would indicate the relative importance of products.

check first the correlation between variations in utilization rates and R-index values after having controlled for variations in preferences rates and other potential determinants of utilization rates. Indeed, if after controlling for preference margins, one finds the expected negative correlation between utilization rates and R-index values, variations in R-index values can be used as a proxy for the likely costs of PRSO.

Prior to correlating utilization rates u_i with preference margins and R_i values, note that u_i rates vary greatly across broad categories of products in both NAFTA and ACP regimes. Since the decision to export is taken at the firm level, if data were collected at the firm level, we would only have utilization rates of zero and one. In fact the utilization rate is observed at the HS-6 product level, so the process of aggregating zero-one firm decisions will produce u_i rates in the zero-one range at the HS-6 level. Thus the distribution reflects firm heterogeneity which can be due to a host of factors like different products, different administrative compliance costs, or contract prices differing across shipments.

Furthermore, recall that utilization rates show the proportion of exports to the Northern partner having requested those preferences. As with calculations of average tariffs, this will not capture the impact of prohibitive RoO, i.e. cases where the Southern partner exporters cannot satisfy the rule and hence there are zero exports of the product. Thus high utilization may in some instances reflect very restrictive rules of origin. Comparing the product structure of exports under PANEURO and NAFTA rates in table 4, one might be tempted to conclude that the higher utilization rates for NAFTA

reflect more stringent RoO.[12] This observation also suggests caution in interpreting the econometric results that follow. Finally, note the bunching of u_i values around zero and one values, the bunching being more pronounced for PANEURO than for NAFTA. The bunching is particularly pronounced for PANEURO final products where only about 18% of the utilization values outside the zero and one values. Hence, one can expect it to be difficult to correlate utilization rates with R-index values.

Insert table 4 here: Distribution of utilization rates and preference rates

With these caveats in mind, assume then that utilization rates at the tariff-line level, u_i, depend linearly on the tariff preference rates, τ_i, and on the index of restrictiveness, R_i, according to the following linear model:

$$u_i = \lambda + \alpha\tau_i + \theta R_i + \sum_k D_k + \varepsilon_i \qquad (0.2)$$

where i is an index indicating data at the tariff line level and D_k is a set of dummies (either country dummies or dummies for stage of processing). The expected signs of the coefficients of interest in (0.2)are: $\hat{\alpha} > 0,\ \hat{\theta} < 0$.

In (0.2) it is assumed that τ_i and R_i are exogenous. For preferential rates, this is plausible. However the index is constructed from the PSRO which are negotiated knowing the preference margin. So there is a potential multicollinearity

[12] Trefler (1993) estimated this bias in the case of import volumes and tariffs and NTBs and found that the estimated elasticity of import demand to NTBs was ten times higher when it the endogeneity of NTBs to imports was taken into account.

between τ_i and R_i in (0.2).[13] Finally, because of censoring values, estimation is carried out with a double-censored Tobit estimation procedure. Results are reported in table 5.

Insert table 5 here: Correlates of utilization rates

The first four columns of table 5 report the results from estimating(0.2) for NAFTA. For all estimates, the coefficients have the expected signs and are significant at the 1% level. The remaining columns report the results for PANEURO. The same expected sign pattern emerges here as well, with the preference coefficient values generally higher than for NAFTA and the ROO coefficient values generally smaller. Not surprisingly, the results for the final goods sector are less significant because of the bunching of observations around utilization rate values of zero and one (col. 7). Adding country dummies does not alter coefficient values, though it improves slightly the estimates for the final good sample (col. 10). Adding a dummy for LDCs indicates that a higher utilization rate for that group of countries, which one would expect since non-LDCs face have less preferential access.[14] Finally, as expected, using trade weights (compare cols. 2 and 1 and cols. 5 and 6) lowers the estimated coefficient values.

In view of the above encouraging results, we feel justified to use values of the R-index to carry out a non-parametric

[13] An endogeneity problem would also arise if a second equation explaining R_i as a function of τ_i and another (omitted) variable influenced the endogenous variable, u_i. Unfortunately, we do not have a good instrument at our disposal, and in any case instrumenting would be difficult if it were to take place over the PRSO variables which all take zero-one values except for VC. In reality, PSRO are probably negotiated simultaneously with the speed of phase-in (at least this is the negotiation process described for NAFTA by Estevadeordal (2000), and there is also a more limited phase-in for EBA).

[14] Simple [trade-weighted] average MFN tariffs for LDCs are 4.2% [5.0%] and for non-LDCs 15.5%, [5.4%] while GSP (EBA) tariffs are 0% for LDCs while for non-LDCs ACP tariffs are 0% [0.2%] and GSP tariffs are 6.9% [2.7%].

estimation of upper and lower bound estimates following inspiration from early work by Herin (1986) for NAFTA. As in Anson et al. (forthcoming) where a similar exercise was carried out for NAFTA using Estevadeordal's (2000) R-index, we carry out non-parametric compliance cost estimates.

By revealed preference, for headings with $u_i = 100\%$, the average preference margin, $\overline{\tau}_i$, is an upper-bound, c^U, for compliance costs (as c_i cannot be greater than the benefit conferred by τ_i). Likewise, for headings with $u_i = 0\%$, the preference margin gives a lower-bound estimate, c^L. For the remaining sectors with $0\% < u_i < 100\%$, assumptions must be made. One could argue that, heterogeneity of firms notwithstanding, firms would be indifferent to exporting under the preferential regime. Then, an approximation of compliance costs would be given by the average rate of tariff preference computed for the remaining sectors, i.e. on the sample $0\% < u_i < 100\%$. Applying this reasoning, we obtain the estimates in rows 1-3 in table 6 (unweighted estimates in parenthesis).

The R-index can then be used to breakdown the administrative cost component in total compliance costs. Let total compliance costs c_i be given by:

$$c_i = \delta_i + \sigma_i \qquad (0.3)$$

where δ_i is the administrative component and σ_i is the distortionary component and all variables are expressed as a percentage of unit price. Assume that administrative costs would be negligible for firms on their participation constraint, i.e. for ($0\% < u_i < 100\%$), provided that firms would also be confronted with low values of r_i , i.e. values

corresponding to a change of tariff classification at the subheading level, CS. This corresponds to $r_i \leq 2$ (not much paperwork is involved in "proving" a change of subheading). Hence, calculating preference margins for utilization rates close to 100% (say $u_i = 95\%$ or $u_i = 90\%$ to be on the safe side when $r_i \leq 2$), gives an upper bound of the distortionary component, σ_i. These estimates are given in row 7.

Insert table 6 here: Estimates of Compliance Costs of Rules of Origin

The rather large differences between the PANEURO and NAFTA estimates, especially when using unweighted data, suggest caution in interpreting these estimates since too much weight is probably given to outlier observations with small trade volumes.

Nonetheless, the higher estimates for the EU are coherent with likely higher administrative costs associated with certification. PANEURO relies on a two-step private and public certification method which is stricter that certification under NAFTA where it is single-step private certification that need not be carried out each time (see Estevadeordal and Suominen (forthcoming, tables 5 and 6).

Further caution is also warranted by an examination of the pattern of preferences requested under PANEURO.[15] Indeed, if

[15] Based on the same data, Cadot, de Melo and Tumurchudur (2005, table 3.10) estimate that the 4 non-LDCs in the group of 16 ACP countries of East and South Africa lost about 16% of a total value of preferences estimated at €201 million by requesting the less favorable trade regime (usually MFN instead of ACP) but occasionally GSP instead of ACP. The former choice which accounts for the bulk of losses could be attributable to compliance costs, but the latter could reflect also ignorance or recording mistakes. Interestingly, for the 12 LDCs in the group who had an estimated value of

there are costs in proving origin, then one should not observe exporters requesting preferences when there are no preferences, yet at the HS-6 digit level there were 4% of the tariff lines with such requests. Neither should one observe requests for preferential status when preferential margins are low, here assumed to be $\tau_i = 3\%$.[16] Yet, according to the bottom row of table 6, there were 10% of tariff lines. At best, the data are only broadly consistent with the estimated values reported here.

5. Conclusions

This paper has compared the product-specific rules of origin (PSRO) that are used in the two best-known North-South FTAs: NAFTA and the PANEURO system single-list used by the EU in all its FTAs. Building on earlier work by Estevadeordal (2000), we use an observation rule to build a restrictiveness index intended to capture the complexity of PSRO across tariff lines. Much like the effective rate of protection is intended as a single measure of the complexity of a tariff regime, the resulting R-index purports to fill the same role in a much more limited way (because of the inherent difficulties in assessing the restrictiveness of varied and complex measures) in the case of PSRO.

Higher values of the constructed synthetic ordinal R-index at the tariff line level correspond to PSRO perceived to be more restrictive. Higher (lower) R-index values are found in sectors with tariff peaks (low tariff sectors) this reflecting widely perceived characteristics of PRSO, namely that they are

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preferences of €95 million lost less than 0.01% from requesting the less favorable regime.

[16] Using threshold estimation techniques, Manchin (2004) estimates for the same data that preferential status is not asked when $\overline{\tau}_i < 3-4\%$

tailor-made to fit the protectionist interests of lobby groups in the Northern partner. Regressions of utilization rates of preferences at the product line level for PANEURO an NAFTA also show that, after controlling for the effect of preferential access on utilization rates, sectors with higher R-index values have lower utilization rates.

Two applications follow. First, the index is used to study the pattern of PSRO across activities and countries. A progression of the restrictiveness of PSRO is observed as one moves down the sectoral classification to activities with higher processing (and hence higher tariffs in the countries granting market access via preferences). Non-LDCs and LDCs who will jointly negotiate EPAs with the EU are also shown to be affected differently because of the commodity composition of their exports to the EU, and non-LDCs face the most restrictive PSRO in sectors in which they have a revealed comparative advantage (in the sense of high export volumes).

Second, revealed preference calculations on utilization rates combined with the R-index are used to estimate the overall restrictiveness of the two regimes yielding trade-weighted compliance [administrative] cost estimates of approximately 8.0% [6.8%] for PANEURO and 6.8% [1.9%] for NAFTA. While these estimates should be interpreted with caution for reasons discussed in the text, the higher administrative costs for PANEURO are consistent with the more cumbersome procedures required for certification in the EU-based agreements.

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Tables and figures to

Product Specific Rules of Origin in EU and US Preferential Trading Arrangements: An Assessment

Table 1
Regime-Wide RoO in NAFTA and EU's GSP and Cotonou Agreements

PTA	De minimis or tolerance rule	Absorption (roll up)	Cumulation	Drawback allowed	Certification method
NAFTA	7(except agr. & ind. prod; 7% of weight in chs 50-63)	Yes (except autos)	Bilateral	No after 7 yrs	(S-C)
US-Chile	10(except in agr. & processed agr. prod)	Yes	Bilateral	Not mentioned	(S-C)
US-GSP	10 (10% of weight in chs 50-63)	Not mentioned	Bilateral, limited diagonal	Not mentioned	(S-C)
Cotonou Agreement	15%	Yes	Full	Not mentioned	T-S (PP); (L S-C)
EU GSP	10% (excepted chps 50-63)[a]	Yes	Bilateral, limited diagonal	Not mentioned	T-S (PP); (L S-C)

Source: EU GSP and Cotonou Agreements text; Estevadeordal and Suominen (forthcoming) for NAFTA.
Notes: a/ Chapters 50-63 (textiles & apparel) do not benefit from a de minimis provision.
T-S (PP) = Two-step private and public;(L S-C) = limited self-certification (S-C)= self-certification.

Table 2
Distribution of PSRO under NAFTA and PANEURO

% of tariff lines	"No other requirement" or "EXC"		"TECH" or "TECH+EXC"		"VC" or "VC+EXC"		"TECH+VC" or "TECH+VC+EXC"		"Wholly obt'd"		Other addit. Requir.		SUBTOTAL	
	NAFTA	PAN	NAFTA	PAN	NAFTA	PAN	NAFTA	PAN	NAFTA	PAN	NAFTA	PAN	NAFTA	PAN
No CTC	0.54	0.59	0.0	2.59	0.0	12.98	0.0	0.20	0.0	8.10	0.0	7.02	0.54	31.47
CI	0.02	0.0	0.0	0.0	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.0
CS	3.81	0.11	0.44	0.04	0.1	0.38	0.0	0.0	0.0	0.07	0.0	0.36	4.35	0.95
CH	36.27	16.50	0.16	7.76	4.12	12.78	0.1	0.07	0.0	0.29	0.0	13.87	40.65	51.26
CC	48.66	0.0	5.78	7.31	0.0	0.0	0.0	0.14	0.0	0.0	0.0	0.21	54.44	7.67
Altern.												8.65	0.0	8.65
Total	89.3	17.19	6.38	17.69	4.24	26.13	0.1	0.41	0.0	8.45	0.0	30.12	100	100

CTC = change in tariff classification with CC = Change in Chapter / CH = Change in Heading / CS = Change in Subheading / CI = Change in Item;
EXC = Exception to change of tariff classification;
VC = Regional Value Content;
TECH = Technical Requirement.
Note: Each cell is the percentage of tariff lines that have the ROO in the corresponding row and in the corresponding column.

Table 3
PSRO Restrictiveness Index and Protection

	Index value[a,b]	
	NAFTA	PANEURO
Tariff peaks[c]	6.2(257)	4.20(3595)
Low tariffs[d]	4.8(1432)	3.41(6092)
Total number of tariff lines	3555	19720

Notes:
Number of tariff lines in parenthesis. Only tariff lines with positive exports (after excluding the outliers)are considered.
[a]All values are trade weighted averages
[b]Outlier tariff preferences excluded for NAFTA and PANEURO
[c]All tariff lines that exceed 3 times the average tariff level
[d]All tariff lines that are less than one third of the average tariff
Source: Authors calculations

Figure 1:
Distribution of R-index

Figure 1a : NAFTA

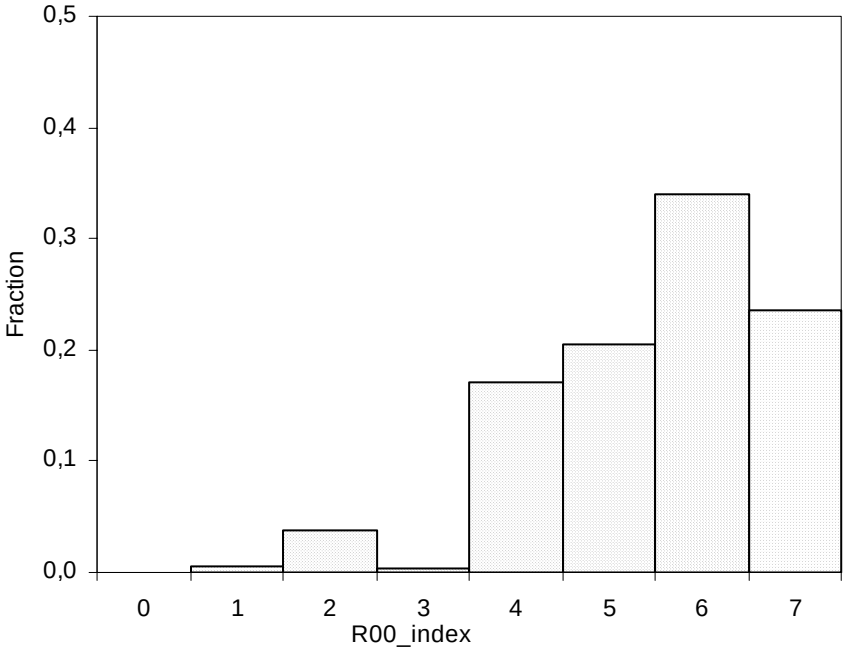

Figure 1b : PANEURO

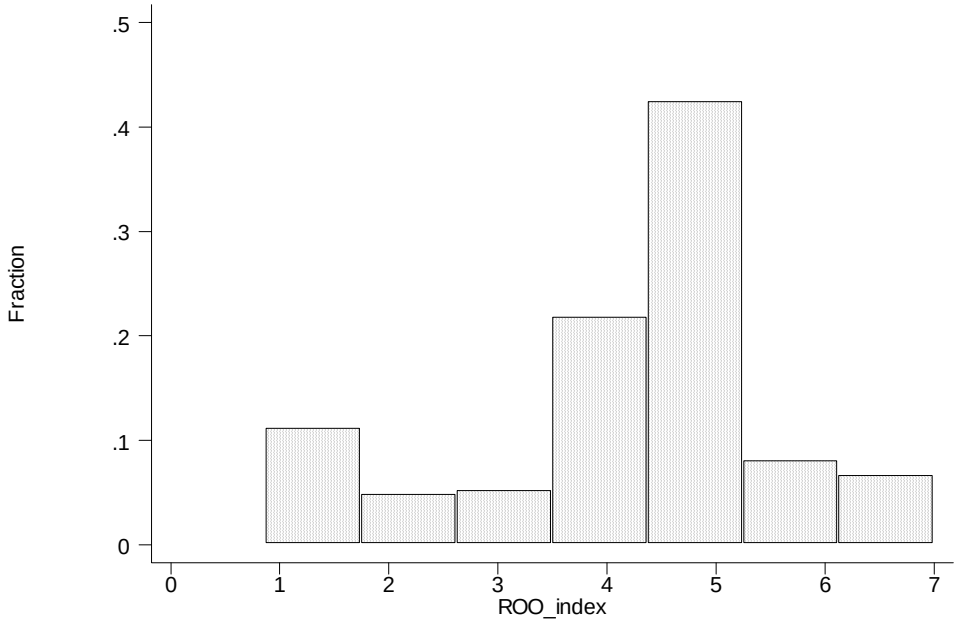

Figure 2:
ACP average PANEURO R-index: LDCs vs. non-LDCs

Figure 2a : Unweighted averages

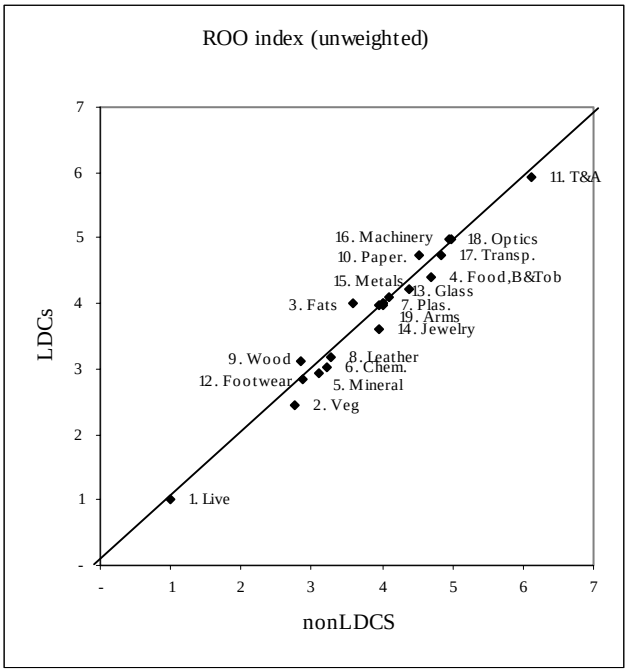

Figure 2b: Trade-weighted averages

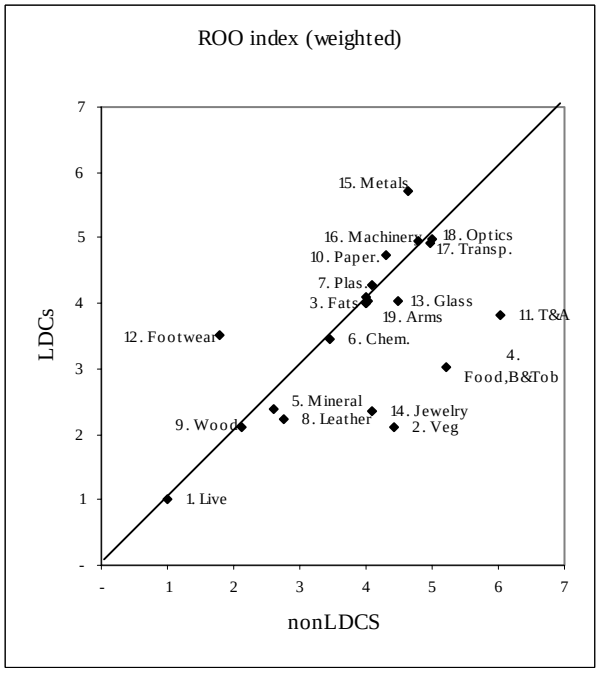

Figure 3:
Preferences and ROO Across EU PTAs

Figure 3a : PANEURO

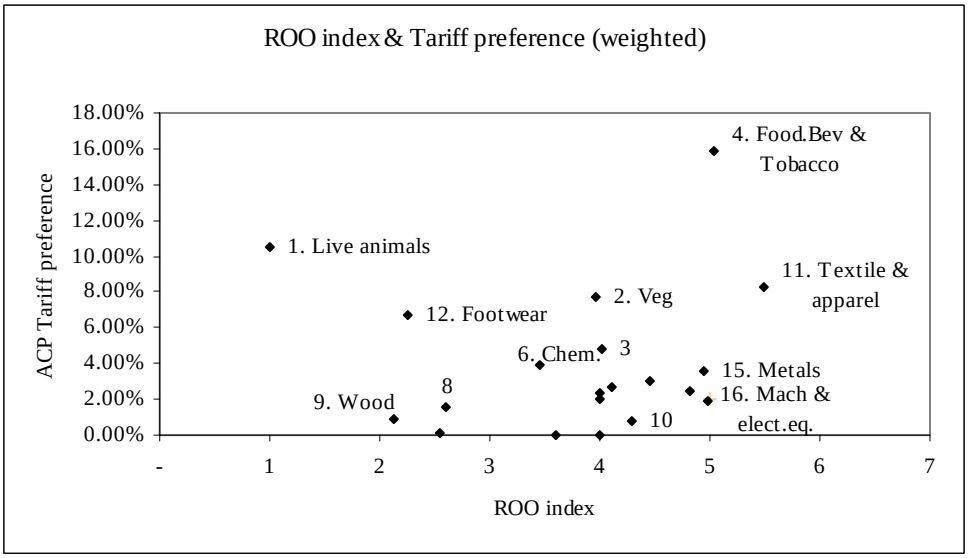

Figure 3a : NAFTA

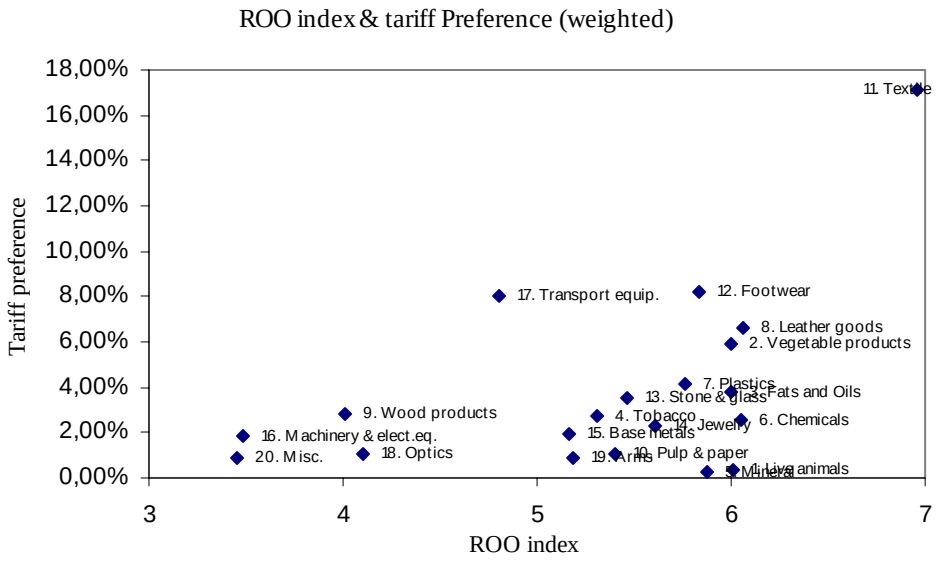

Table 4:
Distribution of utilization rates and preference rates

Utilization rates (u_i)		
	EU PANEURO	NAFTA
All sectors	Ri 4.3	Ri 5.46
$u_i = 0$	59.3%	32.4%
$0 < u_i < 1$	20.8%	41.4%
$u_i = 1$	19.9%	26.3%
Intermediates	Ri 3.82	Ri 5.98
$u_i = 0$	48.7%	20.1%
$0 < u_i < 1$	24.1%	30.7%
$u_i = 1$	27.2%	49.1%
Final goods	Ri 4.79	Ri 5.12
$u_i = 0$	65.4%	34.2%
$0 < u_i < 1$	18%	50%
$u_i = 1$	16.6%	15.9%
Preference rates (τ_i): Quartile distribution		
All sectors	4.21%	4.11%
Quartile 1	(25%:0.0)	(25%:0.0)
Quartile 2	(50%:2.7%)	(50%:2.6%)
Quartile 3	(75%:6.5%)	(75%:5.5%)
Intermediates	4.42%	4.81%
Quartile 1	(25%:0.9%)	(25%:0.6%)
Quartile 2	(50%:4.8%)	(50%:3.7%)
Quartile 3	(75%:7.2%)	(75%:7.4%)
Final goods	4.2%	4.13%
Quartile 1	(25%:1.1%)	(25%:0.0)
Quartile 2	(50%:2.7%)	(50%:2.5%)
Quartile 3	(75%:5.95%)	(75%:5.0%)

Notes:
Data for NAFTA are for 2001 and data for PANEURO for 2002. Unweighted data.

Table 5:
Correlates of Utilization rates(u_i)

	NAFTA				EU ACP							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	-0.39 (5.2)†	0.06 (1.6)	-0.25 (3.3)†	-0.08 (0.37)	-0.56 (10.9)†	0.51 (27.95)†	-1.30 (15.4)†	-0.24 (1.76)*	1.55 (2.31)‡	0.92 (1.26)	0.80 (0.83)	-0.68 (12.7) †
Preference (τ_i)	6.20 (20.5)†	1.77 (10.3)†	4.31 (14.1)†	9.17 (11.7)†	12.2 (33.5)†	2.51 (23.98)†	13.5 (27.9)†	10.6 (7.26)†	10.8 (32.3)†	11.8 (27.5)†	6.83 (5.04)†	12.1 (33.4) †
ROO (R_i)	-0.125 (9.0)†	-0.10 (12.1)†	-0.25 (3.31)†	-0.09 (2.59)†	-0.12 (11.8)†	-0.04 (11.02)†	-0.02 (1.52)	-0.08 (2.67)†	-0.13 (13.7)†	-0.05 (3.72)†	-0.02 (0.90)	-0.11 (11.6) †
LDC dummy												0.34 (9.9) †
All product	Y	Y			Y	Y			Y			Y
Final			Y				Y			Y		
Intermediate				Y				Y			Y	
Country dum									Y	Y	Y	Y
Trade weighted		Y				Y						
# obs	3555	3555	2176	1048	14012	14012	10665	1906	14012	10665	1906	14012
Log likelihood	-3552.6	-5033.5	-2121.1	-967.8	-12767.2	-14493.8	-8977.4	-1976.8	-11776.1	-8016.0	-1794.32	-12717.3

Notes:
† = Significance at 1% level; ‡ = Significance at 5% level; *= Significance at 10% level;
Y= Yes, corresponding dummy variable included.

Table 6:
Compliance Cost Estimates
(percentages)

		PANEURO	NAFTA
	Row	Average τ_i	Average τ_i
		Total Compliance Costs (c)	
$u_i = 0$	1	$c^L = \overline{\tau}_i = 4.3(4.7)$	$c^L = \overline{\tau}_i = 0.2\,(0.3)$
$0 < u_i < 1$	2	$\overline{c} = \overline{\tau}_i = 8.0\,(7.2)$	$\overline{c} = \overline{\tau}_i = 6.8\,(6.2)$
$u_i = 1$	3	$c^U = \overline{\tau}_i = 10.2\,(8.2)$	$c^U = \overline{\tau}_i = 7.6\,(7.1)$
		Distortionary cost (σ)	
$R_i \le 2$ & $u_i \ge 95\%$	5	$\sigma^U = \overline{\tau} = 0.9\,(3.8)$	$\sigma^U = \overline{\tau} = 4.9\,(4.4)$
$R_i \le 2$ & $u_i \ge 90\%$	6	$\sigma^U = \overline{\tau} = 1.2\,(3.9)$	$\sigma^U = \overline{\tau} = 4.9\,(4.3)$
		Administrative cost estimate (δ)	
	7	$\delta = \overline{c} - \sigma^U = 8.0 - 0.9 = 7.1\,(3.4)$ $\delta = \overline{c} - \sigma^U = 8.0 - 1.2 = 6.8\,(3.3)$	$\delta = \overline{c} - \sigma^U = 6.8 - 4.9 = 1.9\,(1.8)$ $\delta = \overline{c} - \sigma^U = 6.8 - 4.9 = 1.9\,(1.9)$
$\tau_i = 0$ & Request[c]	8	# 691 lines[a]	# 1089 lines[b]
$\tau_i \le 3\%$ & Request[c]	9	# 2173 lines[a]	# 1972 lines[b]

Notes: Trade weighted estimates appear first followed by corresponding unweighted averages in parenthesis

[a] Total number of tariff lines (at HS-6 digit): 19720
[b] Total number of tariff lines (at HS-6 digit): 3555
[c] Only for PANEURO

Annex to

Product Specific Rules of Origin in EU and US Preferential Trading Arrangements: An Assessment

This annex describes the construction of the restrictiveness index and compares it to an earlier index constructed by Estevadeordal and Suominen (ES) (2003). EU ROO are defined at the HS-4 digit, however the fact that EU ROO were given at the more detailed HS 6 digit level, we have constructed our index at the HS 6 digit level that corresponds to the 5595 tariff lines (see table A1). This also facilitates comparisons with NAFTA's ROOs which are defined at the HS-6 level.

Let ΔCC stand for a change of chapter, ΔCH for a change of heading, ΔCS for a change of subheading, and ΔCI for a change of item. Like Estevadeordal's index, our index is based on the following classification convention for Change of Tariff Classification (CTC) criteria:

$$\Delta CC > \Delta CH > \Delta CS > \Delta CI.$$

Therefore, as far as the CTC is concerned, we follow the above ES's assumptions in the construction of our observation rule (see details in table A1).

In both EU SL and NAFTA, in most cases, a CTC criteria is always accompanied by one or two (in a few cases even 3) of the other requirements such as Value Content, Technical Requirement, Exception, Wholly obtained, Allowance and NONOR.

According to ES's assumptions a value of 2 is assigned to a Change of Subheading, 4 to a Change of Heading and 6 to a

Change of Chapter. Therefore the observation rule assigns higher values to the index resulting from the CTC when these other requirements are added (and assigns a lower value in the case of allowance being followed after the CTC criteria).

For instance, from table A1, a change of Heading -*ΔCH* takes a value of 4, but the value increases to a 5 when *ΔCH* is accompanied by R1(Wholly obtained criteria) or R2(either one of *ΔCS*, Technical Requirement and Exception). Conversely, it takes a lower value of 3 when it is accompanied by an Allowance Requirement.

In the case of a Value Content requirement we have taken a different approach from ES since in our case the requirement varies between 50% and 85%. Thus we use a cut-off point of 60% originating, and we assign a value of 4 to a VC strictly smaller than 60% (VC1), and of 5 to a VC higher than or equal to 60% (VC2).

Therefore whenever a VC is combined with other requirements (including a CTC) the assigned value will depend on whether the percentage of VC is higher or lower compared to the cut-off point of 60%. (See details in table A1.)

Allowances are treated as mitigating factors that make the index jump down one level. In several cases, however, allowances are given along with certain restrictions such as adding a Value Content restriction (AllowVC).

Exceptions are treated as aggravating factors making the index jump *up* one level. Exceptions as a stand alone are assigned a value of 2.

In a few instances (8.8% of tariff lines), EU PSRO allow for a choice between alternative composite rules to determine a product's origin. For each alternative, we computed a value for the R-index and we assigned the lowest index value for that line, since in principle the exporter, not customs, chooses which rule applies. We therefore assign the index value of the least stringent of the two rules.

Another alternative for exporters is between a VC rule and a composite alternative. This option was available for 29.4% of the tariff lines. Again, we assigned the lowest index value to the corresponding tariff lines.

The largest differences between our index and ES's index come from the different approaches to the "wholly produced" (WH). Index values are different mostly for two reasons. First, because of the importance of agricultural goods in ESA exports, the overall value for our index is lower than ES's. Second, we have tried to take into account the choices facing exporters, and have consequently assigned the lowest possible value for the index when several options were available.

Table A1 The Observation Rule to construct the R index

r=1 (R1) if
y*=NC
y*=WH
y*=R2+allow (*)

r=2 (R2) if
y*=ΔCS
y*=TECH
y*=EXC
y*=R1+R2

r=3 if
y*=R2+R2
y*=ΔCH +allow (*)

r=4 if
y*=ΔCH
y*=VC1
y*=VC1+Oth.Req
y*=ΔCH+R2+allow (*)

r=5 if
y*=VC2
y*=VC2+Oth.Req
y*=VC1+R1 (orR2)
y*=ΔCH +R1 (or R2)
y*=ΔCH +R1 (or R2)+R1 (or R2)
y*=ΔCH +VC1
y*=ΔCH +VC1+R1 (or R2) +allow (*)

r=6 if
y*=ΔCC or
y*=VC2+R1 (or R2)
y*=ΔCH +VC2
y*=ΔCH +VC2+R1 +allow (*)
y*=ΔCH +VC1+R1 (or R2)
y*=ΔCH +VC1+ R1 (or R2) +R1(or R2)
y*=VC1+R1 (or R2) +R1 (or R2)

r=7 if
y*=VC2+ R1 (or R2) +R1 (or R2)
y*=ΔCH +VC2+R1 (or R2)
y*=ΔCH +VC2+ R1 (or R2) +R1 (or R2)
y*=ΔCC +R1 (or R2)
y*=ΔCC +VC
y*=ΔCC +R1 (or R2)+ R1(or R2)
y*=ΔCC +VC+R1 (or R2)+ R1(or R2)

Note: y* is the latent variable approximated by the observation rule and assignment to the corresponding R value on the left-hand side column; (*) only applies for EU ROO; VC1 if VC>40, VC2 if VC <=40; Oth.Requirement are NONOR, VC-R;