DISCUSSION PAPER SERIES

DP17076

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INTERNATIONAL TRADE AND REGIONAL ECONOMICS

CEPR

ISSN 0265-8003

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Discussion Paper DP17076
Published 01 March 2022
Submitted 26 February 2022

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This Discussion Paper is issued under the auspices of the Centre's research programmes:

- International Trade and Regional Economics

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Abstract

An explosion of different Rules of Origin (ROO) has accompanied the spread of Preferential Trade Agreements (PTAs) around the world. These apply equally to non-reciprocal PTAs like GSP (Generalized System of Preferences), AGOA (African Growth and Opportunity Act), EBA (Everything but Arms) and all the reciprocal PTAs. These Preferential ROO (PROO), the subject of this paper, are different from Non-Preferential (NPROO). Often tailor-made, PROO aim to prevent transshipment and trade deflection across PTAs. At the same time, these PROO are supposed to be sufficiently user-friendly to support supply chain trade, and in Africa, regional value chains at the continental level. PROO are non-tariff barriers (NTBs) for exporters. Complying with ROO requirements entail costs for producers, exporters, and customs officials. Observers, firms, customs officials, and policy-makers have advocated simplification and, in the case of large-membership PTAs like African Continental Free Trade Area (AfCFTA), harmonization as well. Following the creation of the WTO and the accompanying move towards a rules-based world trade system, many Non-Tariff Measures (NTMs), like absolute quotas, domestic content requirements, have been abolished, leaving PROO as one of the few areas where countries can negotiate requirements reciprocally unimpeded. The result is a forest of ROO which we still discover and know relatively little about, except perhaps that if (knowledgeable) traders estimate that compliance costs exceed benefits from preferential market access, they will not apply for preferential status. Indeed, for the majority of PTAs, publicly available information on Preference Utilisation Rates (PURs) are not available. Even, if PURs were available, all we would know is that rents from preference margins would exceed compliance costs. The paper surveys the literature drawing on the extensive database in ITC's ROF database covering 54,000 distinct ROO spread across 370 PTAs to illustrate the issues covered in the literature. First, word overlap and regulatory proximity metrics are applied to the Regime Wide Rules (RWRs) and Product Specific Rules (PSRs) in the major families of ROO: Association of Southeast Asian Nations (ASEAN), EU PANEURO, North American Free Trade Agreement (NAFTA) to gauge differences across these families. The results from the comparisons raise the possibility of excessive diversity in ROO criteria, which may apply also to ROO for non-preferential purposes (e.g. 'made in' labelling). The remaining sections review what we know about the compliance costs associated with ROO requirements. These costs are illustrated graphically in section 3 and summarized in a formula that decomposes compliance costs along two dimensions: distortionary costs resulting from the restrictiveness of ROOs and administrative costs. Section 4 surveys the evidence by themes: (i) determinants of the utilisation of preferences; (ii) effects on third countries outside the PTA; (iii) choice of rule; (iv) preference margin and complexity of rules; (v) trade deflection; (vi) firm-level evidence. In conclusion, drawing lessons from the empirical literature is a complicated exercise because preference uptake, an important indicator of compliance costs, is only available for a handful of PTAs at the disaggregated product level.

JEL Classification: F14, F61

Keywords: NTMs, Rules of origin, Product-specific rules of origin, Regime-wide rules of origin, compliance costs

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Acknowledgements
Thanks to Paul Baker, Bernard Hoekman, Julien Gourdon, Marcelo Olarreaga, for comments and discussions. Melo thanks the French National Research Agency under program ANR-10-LABX-14-01.Opinions and remaining errors are the sole responsibility of the authors.

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The paper surveys the literature drawing on the extensive database in ITC's ROF database covering 54,000 distinct ROO spread across 370 PTAs to illustrate the issues covered in the literature. First, word overlap and regulatory proximity metrics are applied to the Regime Wide Rules (RWRs) and Product Specific Rules (PSRs) in the major families of ROO: Association of Southeast Asian Nations (ASEAN), EU PANEURO, North American Free Trade Agreement (NAFTA) to gauge differences across these families. The results from the comparisons raise the possibility of excessive diversity in ROO criteria, which may apply also to ROO for non-preferential purposes (e.g. 'made in' labelling).

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1. Introduction

Two major trends characterize the world trading system today. On the one hand, it is increasingly structured by preferential trade agreements (PTAs), of which there are today close to 500 in force. There is a new one almost every month (see e.g. the Rules of Origin Facilitator (ROF) or the World Bank's Deep Trade Agreements data set). On the other hand, since 2016, many among the world's largest free trade areas have either been formed, renegotiated or separated, namely the Progressive Agreement for Trans-Pacific partnership (CPTPP), the African Continental Free Trade Area (ACFTA), the Regional Comprehensive Economic Partnership (RCEP), the United States-Mexico-Canada (USMCA), and the EU-UK Trade Cooperation Agreement (TCA). Against this background, the growth of intermediate goods trade now accounts for almost two-thirds of world trade (Johnson and Noguera (2012)). The production chain of final goods has become a sophisticated network across industries and geographical locations. International trade is increasingly involving "trade in tasks" within Global Value Chains (GVCs).

PROOs stand in the middle of these two major trends. They have the potential to make them incompatible because they constrain the sourcing choices of multinational firms along regional patterns dictated by existing PTAs, whereas GVC optimization may call for different choices. For example, rules of origin in Textiles and Apparel under NAFTA have forced Mexican exporters of apparel to the zone to backward integrate up the value chain by sourcing yarn and textiles from their Northern partner to qualify for preferential access in their markets. One of the challenges of "multilateralizing regionalism"—an expression coined by Baldwin (2006)—is to prevent ROOs from working at cross-purposes with the rise of supply chain trade.[1]

Rules of origin are critical components of all Preferential Trade Agreements (PTAs). These 'rules' establish the conditions that products must meet to be eligible for preferential market access. They are there to prevent transshipment of products in which there is negligible regional content (e.g. repackaging via labelling). For developing countries, protecting regional producers of intermediate products in supply chains is an important—if not the main—objective. For example, developing supply chains across the continent is a primary objective of the African Continental Free Trade Area (AfCFTA). In practice, as documented here, ROO are very complicated: they are a nightmare for producers and customs officials alike.[2] Importantly, they have side effects, some unintended. Some observers describe PTAs as "giving with one hand—preferences—and taking away with the other—origin requirements (i.e. ROO)".

Typically, ROO are defined at the HS6 tariff level. However, the Harmonized System (HS) was not designed as a vehicle for conferring origin, its purpose being to provide a unified commodity classification for defining tariff schedules and for the collection of statistics. As a result, methods for determining sufficient processing or substantial transformation has turned out to be challenging in all existing PTAs. If ROOs are 'too complex' or at odds with methods of production used in modern supply chains, they will undo the benefits of preferential market access. On the one hand, ROO need to be sufficiently detailed to 'ring fence' benefits to partners. On the other hand, ROO have to be sufficiently simple and transparent that their compliance costs do not exceed their benefits. [3]

A sizeable literature has documented their effects with several recent contributions urging for simplification and harmonization (e.g., Mavroidis and Vermulst (2018) and Hoekman and Inama (2018). Yet, no clear pattern has emerged about their effects for at least three reasons. First, it is only recently that ROO have been documented sufficiently systematically to allow for comparisons across PTAs. Second, preference utilisation rates (*purs*) are lacking for most PTAs as only a handful of countries their *purs*.[4] Third, data on transactions are rarely available and when they are available, data are lacking in key dimensions like product, size of shipment, or type of firm. Moreover,

[1] Baldwin and Freeman (2021) note that the 2019 pandemic has exposed the fragility of the world trading system relying increasingly on outsourcing and just-in-time inventory. They discuss the alternatives of making GVCs shorter and more domestic or more diversified. In either case, ROO will be a key lever to achieve the objective.
[2] Brenton and Imawaga (2004) report results from a survey administered to customs officials in developing economies by the World Customs Organization. Two-thirds of respondents in Sub-Saharan Africa agreed that dealing with ROO under overlapping trade agreements caused major problems. A majority also agreed that administering ROO detracted from the other objectives of tax collection and trade facilitation.
[3] PTAs and FTAs both require ROO (as do non-reciprocal PTAs like EBA, AGOA and GSP). Here, the terms will be used inter-changeably.
[4] See Abreu (2016) for a tally of preference utilization rates (purs) on reciprocal PTAs for Australia, Canada, China, the European Union and the United States. In response to an engagement at the WTO ministerial in 2015, 14 countries granting non-reciprocal preferences to LDCs have reported *purs* to the WTO. WTO (2021) reports these *purs* by country and product over the period 2015-19. Also see in Crivelli and Inama (2020) how *purs* can be used to reform PROOs towards LDCs.

assuming firms know about the possibility to file for preferential access and the associated modalities, even if they use preferential access, one can only surmise that compliance costs are less than benefits from preferential access.

In view of these gaps in our knowledge, this paper has four objectives.

- To present briefly the landscape of ROO among a few typical PTAs using heuristics that help to show the complexity and variety across PTAs (section 2)
- To present the simple analytics of ROO to disentangle the components of compliance costs (section 3)
- To survey the main findings in the literature (section 4)
- To make suggestions about next steps to fill the gaps in our knowledge (section 5)

Section 2 describes briefly the two different families of ROO, the Regime-Wide Rules (RWRs) and the Product-Specific Rules (PSRs) to give a flavour of the complexity of these rules across PTAs. This large number of different rules raises the possibility of 'too many' different rules with many suggesting that ROO should be consolidated, harmonized and simplified (Estevadeordal and Suominen (2006), Cadot and de Melo (2007), Hoekman and Inama (2018)). However, we need to know how different these rules actually are. The two heuristics, text overlap and regulatory distance, used to compare RWRs and PSRs across PTAs, informs on the extent of differences across rules.

Origin requirements must be demonstrated by Certificates of Origin (COO) issued to exporters. Meeting the exigencies of a COO involves compliance costs. These costs depend on the large variety of rules that results in different costs across sectors and firms. These costs are discussed in section 3 starting from a balance sheet approach to the decision exporters face when deciding on whether to seek preferential market access. On the benefits side, obtaining a COO allows to sell in the destination market at the tariff-inclusive price. Economic costs are then decomposed into four categories (distortion costs, incomplete pass-through of preferences, meeting the complexities of PSRs and administrative costs), leading to a decomposition formula. These compliance costs are then illustrated graphically using the proxy indicators used in empirical estimates.

Section 4 reviews the evidence, a difficult exercise because, as noted above, preference uptake, an important indicator of compliance costs, is only available for a handful of PTAs. This review of evidence is organized along the following themes: (i) determinants of the utilisation of preferences; (ii) effects on third countries outside the PTA; (iii) choice of rule; (iv) preference margin and complexity of rules; (v) trade deflection; (vi) firm-level evidence.

Section 5 concludes with considerations on what we need to know to make progress.

2. The complexity of Rules of Origin

When it comes to describing and analysing ROO, the devil is in the details. This is apparent from the sheer number of PSRs (the ROF data base identifies over 54,000 textually distinct PSRs, about 10 times the number of distinct HS-6 level codes to which one must add 30 different RWRs). Is this large number of different rules necessary to meet the stated objectives of ROO which is to prevent transshipment, infant-industry protection and/or development of regional value chains? Is this large number a reflection of accommodating opposing interests by private sector lobbying with governments?

ROO are classified in two categories: Regime-wide rules (RWRs) and Product-specific Rules (PSRs). Both are described in detail in several places (see e.g., Gourdon et al. 2021a), so we only present them briefly here starting with RWRs that are the easiest to describe, then turn to the more complex PSRs where diversity is greater. This description also serves to present two metrics, text overlap and regulatory distance used to describe differences across rules.

2.1 Regime-wide Rules (RWRs)

The ROF reports 30 different RWRs provisions classified under two categories: 16 relating to 'process' and 14 to 'certification'. With few exceptions, each provision is either included or not included which allows using a zero-one [Yes/ No] codification making it easier to compare them using a regulatory distance measure.

Table 1 measures the differences across the three leading families of PTAs: (i) the EU PANEURO, here represented by EFTA FTA, approximately applied to all EU PTAs; (ii) NAFTA, the inspiration for all US FTAs; (iii) ASEAN, the

model for Asian PTAs. The table also includes MERCOSUR representing Latin America, and SADC representing African continent and playing a major influence for TFTA and AfCFTA design of rules of origin.[5]

Table 1: How different are RWRs across the main PTA families: Textual overlap and regulatory distance?

PTA	ASEAN	EFTA	MERCOSUR	NAFTA	SAFTA	SADC
ASEAN		**4**	NA	**14**	**2**	4
EFTA	53		NA	4	**3**	**40**
MERCOSUR	37	30		NA	NA	NA
NAFTA	47	50	37		2	4
SAFTA	**63**	47	**67**	40		4
SADC	47	43	50	53	**60**	

Notes:

The textual overlap measures between a pair of PTAs are above the diagonal. The overlap is computed as a simple average of text similarities between corresponding 30 RW provisions in these PTAs. It can range from 0 (absolutely no overlap) to 100 (all texts are perfectly identical). The computed overlap for MERCOSUR with the other PTAs is 0 because the text is only available in Spanish. To flag this, we entered N.A.

The regulatory similarity similarity measures are reported below the diagonal. They are computed across 30 RW provisions as an average of binary values, where a value of 1 indicates that the provisions coincide, and 0 if they do not coincide in the pair of PTAs.

Source: Authors' calculations based on Rules of Origin Facilitator database

Textual similarity across RWRs is very low except for EFTA and SADC. These low scores reflect mostly differences in drafting styles or in translation when not originally drafted in English. However, when one takes regulatory distance, a more conceptual indicator of similarity, RWR provisions are quite close. These PTAs contain most of the 30 RWRs. Often these provisions coincide, once coded (e.g., type of cumulation, usually diagonal). This is reflected in similarity scores close to, or above, 50%.

2.2. Product-specific rules (PSRs)

Heterogeneity in PSRs is significant across the universe of PTAs. In an effort to isolate the most significant PSRs, these textually different criteria have been collapsed into '1,600 standardized' coded criteria further aggregated into 14 basic types or building blocks. These types are organized around the Revised Kyoto Convention (RKC) of the World Customs Organization (WCO) which defines two main criteria for origin determination: (a) the 'Wholly obtained or produced' criterion (WO) and (b) the 'Substantial transformation' (ST) criterion. The ST criterion is further classified into 4 categories:

1. A Change in Tariff Classification (CTC). This change can be a Change of Chapter (CC); a Change of Heading (CTH); a Change of Sub-heading (CTSH) level)
2. An ad valorem percentage for Regional Value Content (RVC)
3. Specific Processing (SP) operations
4. Exceptions (ECT) and Allowances (ALW)

[5].The selection of PTAs in table 1 is partly inspired by a WCO (2017) legal comparison study that ASEAN, EUROMED, NAFTA and TPP, for detailed comparison on the grounds that at least one of these schemes would necessarily influence any new subsequently concluded PTA in the world.

As with all classifications, some arbitrariness is inevitable. Here we illustrate choices in the classification into 'building blocks', on substance vs. form, and on the mandatory rule, examples that illustrate challenges facing any prospect at harmonization across PTAs.[6]

As building blocks, the 14 basic types of PSRs and additional variations, such as a change in tariff item (CTI) or regional quantity content (RQC) are fit into these 4 categories while, in practice, PSRs mostly rely on combinations of these 14 types, such as alternative PSRs (e.g., a CTH or RVC) or as composites (e.g. CTH and RVC).

Table 2. The "building blocks" present in origin criteria in 370 PTAs

Presence in 370 PTAs	Rule	Definition
5%	**WO**	Good is entirely (i.e., **wholly**) obtained or manufactured in one country without using any non-originating materials.
2%	**NC**	The non-originating inputs are **not required** to be classified in a different HS code than the final good to confer originating status.
9%	**CC**	The originating status is conferred to a good that is classified in a different HS **chapter** than the non-originating inputs.
45%	**CTH**	The originating status is conferred to a good that is classified in a different HS **heading** than the non-originating inputs.
8%	**CTSH**	The originating status is conferred to a good that is classified in a different HS **subheading** than the non-originating inputs.
0.02%	**CTI**	The originating status is conferred to a good that is classified in a different HS **tariff item** than the non-originating inputs.
5%	**ALW**	The originating status is **allowed** to be conferred from non-originating inputs of specific HS codes.
7%	**ECT**	The originating status cannot be conferred to a good if the non-originating inputs are from HS codes listed under **exception**.
8%	**SP**	A good originates in the country where a defined technical requirement, i.e. a **specified working or processing**, has taken place.
62%	**RVC**	A good obtains originating status if a defined **regional value content** percentage has been reached.
0.3%	**RQC**	A good obtains originating status if a defined **regional quantity content** percentage has been reached.
1%	**RVP**	A good obtains originating status if a defined **regional value content** percentage on **a part or parts** has been reached.
0.3%	**RQP**	A good obtains originating status if a defined **regional quantity content** percentage on **a part or parts** has been reached.
3%	**Other**	Origin criteria **other** than related to wholly obtained, CTC, value (quantity) content, or specified process.

Note: "Presence" means % of the type in origin criterion across 3 million PTA x HS6 combinations (*April 2020*)

Source: Authors' elaboration

Table 2 shows the global distribution of these 14 "building blocks". CTH and RVC types of rules dominate the global landscape of PSR. However, it should be noted that some particular forms such as RVP (regional content of specific parts), RQC (regional content based on quantity) and RQP (regional quantity content of specific parts) are also present at times. The upshot is that the total number of combinations captured in the 370 PTAs balloons to 1,600 different PSRs. Additionally, when coding an ECT, the specific HS inputs into the ECT differ across PTAs.

[6] Gourdon et al. (2021a, section 5) discuss at greater length the difficulty in designing criteria to classify PSRs.

Other aspects of PTAs complicate the coding of PSRs. First, PTAs are drafted in different languages with different drafting styles. This results in 54,000 textually distinct PSRs. Second, the total number of distinct PSRs is increased when integrating the different provisions accompanying the PSRs, such as footnotes, product notes, and chapter notes. Third, the total number of "distinct" PSRs is further augmented by differences in the formula for the numerator and denominator in an RVC criterion. Thus, in some PTAs, the RVC is expressed as a *de minimis* value (e.g. 7% for apparel, 10% for other goods, and no *de minimis* for agriculture).

In terms of **substance** rather than **form**, the multiplicity of PSRs identified by this forensic approach likely overstates differences in practice. For example, for textiles and apparel, most PSR criteria boil down to a choice between single-, double- and triple-transformation rules (see table 3). These requirements are drafted in several ways. One option is in terms of a CTC with excluded HS inputs (hence the CTC + ECT form). Another is drafting in words (hence SP). A third option is in terms of a percentage RVC, which is trickier to interpret. The upshot is that it is difficult to establish "substance" correspondence between so that, at first glance, PSR rules appear different for each sector.

Table 3 illustrates how seemingly different PSR on apparel by "form" boil down to single-, double-, and triple-transformation by "substance". Suppose a negotiator is asked to implement the decision to enforce the "triple transformation" rule for apparel (i.e. from Stage 2 onwards in table 3). S(h)e can formulate the rule in words (SP) by stating that the manufacturing of yarn and all further stages have to be carried out within the FTA area. S(h)e can also formulate it as a value-added percentage criterion e.g., a RVC 80% (percentages are illustrative). Or S(h)e can formulate it as CTC rule where S(h)e would list all HS codes for each input that cannot be used in production of apparel if they are non-originating.

This HS list would include all HS codes covering yarns, fabrics and apparel items. The industry experts and analysts will refer to this rule as "triple transformation" or "yarn forward" rule. In the case of NAFTA and USMCA, this rule happened to be adopted and formulated in the form of a CTC criterion with a long HS exception list, with the additional clarification that the product has to be cut and sewn in North America.

Table 3.

Representations of substantial transformation options for apparel in the form of descriptive words, value-added, and HS codes.

Stage of value chain	Product/input	Value added	Transformation (jargon)	HS codes
Stage 4	T-shirt ('cut and sew')	+40%	'single'	HS6 codes
Stage 3	Fabric	+20%	'double'	HS6 codes
Stage 2	Yarn	+20%	'triple'	HS6 codes
Stage 1	Raw cotton	+20%		HS6 codes

Source: Authors' elaboration.

Another ROO policy dimension is whether PSRs should be negotiated for every single HS code in the tariff book, even where both parties apply 0% MFN rate or both parties exclude the product from preferences. The mandatory PSR argument would be defensible for intermediate inputs that will need to qualify for originating status under cumulation further down the value chain or for the possibility of disassembly or other artifice to satisfy a PSR requirement. The mandatory requirement would also be defensible when the MFN bound rate is above 0% or unbound (hence, sometimes in the future the 0% MFN may no longer apply). However, for final consumer goods (such as electronics) with MFN tariffs bound at 0%, this argument is less understandable. Also, this argument does not apply in some country cases such as the US where the merchandise processing fee (usually less than 1%) is additionally eliminated by preferences with FTA partners.

Figure 1 shows the dispersion of RVC criteria in the case of gasoline-engine cars across a selection of 12 PTAs. This high dispersion shows how difficult it would be to harmonize RVCs for cars across PTAs. USMCA (US- Mexico-Canada) FTA has the highest RVC in the world, driven by the previous (Trump) US administration's push to negotiate very strict North American ROO, improving on ROO of NAFTA which were already at 62.5%. This high RVC percentage is also accompanied by a number of additional rules, such as regional labour content and steel and aluminium content requirements. As pointed out by Crivelli et al. (2021), this tightening of the RVC for a sector where the MFN tariff is 2.5% is evidence that successive US administrations have spent time to devise stringent rules to oblige more US content in cars using as leverage the preferential margin of 2.5%.

The Japan-Mexico RVC is also very high. Given that Japan's MFN rate on cars is zero, this RVC is only relevant for Japanese car manufacturers wishing to export to Mexico. Both Japan and Mexico participate in the plurilateral CPTPP (The Comprehensive and Progressive Agreement for Trans-Pacific Partnership) PTA where the RVC is lower (45% or 55% depending on the calculation method). At the same time, Mexico negotiated a very liberal RVC with Panama in the bilateral FTA of 2015 (22% or 32% depending on calculation method). "ASEAN plus" FTAs each have a slightly different percentage. The EU-SADC EPA (not reported here) has the typical percentage of 60% for EU agreements, driven by the PEM model. However, the EU offers a very liberal 30% RVC for least developed countries under its non-reciprocal EBA scheme.[7]

Figure 1.

RVC percentages for cars (HS 8703.23 with gasoline engine) in a selection of 12 PTAs.

Agreement	RVC percentage
USMCA	75%
Japan-Mexico EPA	65%
EU-SADC EPA	60%
China-Peru FTA	50%
CPTPP	45%; 55%
ASEAN-Korea FTA	45%
ASEAN-Japan FTA	40%
ASEAN-India FTA	35%
Central America-Mexico FTA	30%; 35%
EU Everything But Arms	30%
Zimbabwe-Botswana	25%
Mexico-Panama FTA	22%; 32%

Note: When 2 percentages are presented, each percentage is defined by the calculation method

Source: Author's analysis based on Rules of Origin Facilitator.

The two measures used to compare RWRs were sufficient to give an idea of differences across the PTAs compared in table 1. For PSRs, there is too much diversity to hope that these measures can give information on differences across PSRs. Furthermore, one is also interested to have a yardstick of likely compliance costs for different PSRs. A restrictiveness indicator, the 'R-index', first proposed by Estevadeordal (2000) is one such measure. Relative to the similarity and regulatory distance measures, the 'R-index' requires the additional assumption that one can use an observation rule to rank these ROO by order of restrictiveness. For example, for a given product, an RVC of 70% is

[7] Yang (2021) exploits the variation in RVCs in the automotive industry over 2000-14 across 23 PTAs and 26 HS6-digit autoparts. Her results show that ROO facilitate trade diversion, estimating that the impact of RVCs on intermediate trade would be equivalent to the removal of a 19% [53%] ad-valorem tariff when the associated RVC is below [above] 60%. She also detects a hump-shaped relation in the shifting of sourcing with variations in the RVC—when the RVC goes beyond 65%, firms relocate their production elsewhere. This result echoes Head et al. (2021) ongoing study of the USMCA who establish a "ROO Laffer curve" where the average automotive regional content in a car within USMCA first expands then contracts with increasing content requirement.

more restrictive than an RVC of 30%. Likewise, a change of tariff heading (CTH) is more difficult to satisfy than a change of tariff subheading (CTSH). Note though, that this comparison holds in the same activity (under the assumption that technology is the same across firms, but not across sectors even within a country. For example, a change of chapter requirement in most agricultural commodities might be easier to meet than a change of subheading in some chemical or mechanical goods sectors where inputs and outputs are often included in the same subheading.

The resulting R-index is ordinal. An index value of 4 is more restrictive than an index value of 3 but one cannot compare differences in ranks (i.e. a value of 4 is not twice as restrictive as a value of 2). Gourdon et al. (2021a) describes assumptions leading to the construction of the R-index. Exert caution in interpreting ordinal rankings!

3. Disentangling the economics of origin requirements

The proliferation of PTAs and rules within each PTA complicate decision-making by firms (which PTA to select with which partner). The proliferation raises search costs perceived as burden. In addition to having access to the information and its complexities, exporters are confronted with:

(i) *heterogeneity in membership.* Producers in countries with membership in several PTAs, have to choose between several ROO regimes within and across PTAs;

(ii) *heterogeneity in firm characteristics:* A given preferential margin does give the same market access to firms in a sector but not to the same degree of benefit;

(iii) *heterogeneity in ROO requirements:* ROO requirements, especially RVC and other PSRs are costly to satisfy: they reduce the benefits from tariff concessions.

Some of these choices are opportunities, though in the end, producers may either have to split production using different input mixes to export to different partners, concentrate on the market with less restrictive ROOs, or forego requesting preferential access.

Hoekman and Inama (2018) observe a trend towards adoption of similar approaches in North-North PTAs in some product sectors. While some cooperation to reduce the trade-impeding effects of differences in ROO across jurisdictions appears more feasible than is often assumed by observers and policy-makers, compliance costs associated with ROO might still represent a substantial cost in firms' decision to claim preferential access, as documented in ITC NTM business surveys (2015).

This said, this section disentangles the main elements in the growing body of studies and reports to help organize the summary of main findings in section 4. Section 3.1 presents a balance sheet of pros and cons organized around the main effects isolated in the growing literature on preferential ROO. Section 3.2 summarizes these elements in a formula that decomposes compliance costs along two dimensions: distortionary costs resulting from the restrictiveness of ROOs and administrative costs. Section 3.3 gives a graphic presentation of the costs of a binding RVC, the most widespread regime-wide origin requirement across PTAs. Section 3.4 closes with a graphical presentation that links firm heterogeneity with a widely used proxy approach to measure certification costs.

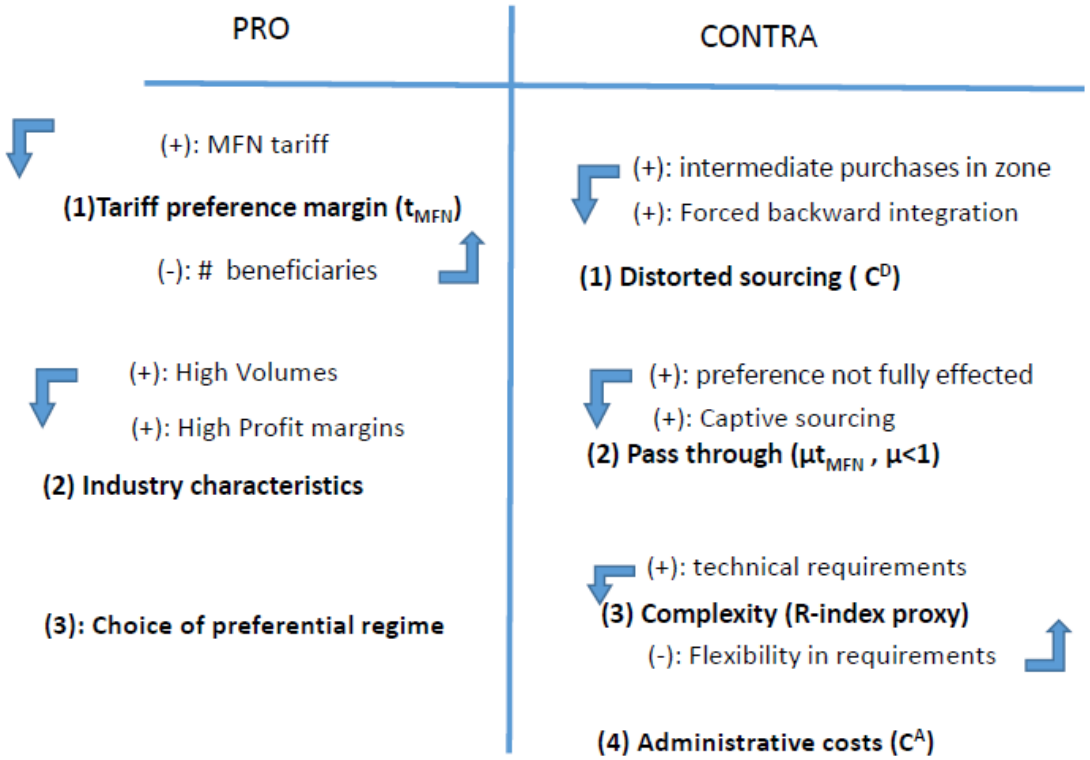
3.1 The Decision to apply for preferences

Table 3 proposes a balance sheet presenting *pros* and *cons* for an exporter deciding whether to sell to his partner under MFN or to request preferential status. Each side of the balance sheet has elements that contribute to that side of the balance sheet (+) and attenuating elements (-). For example, on the *pro* side, the tariff preferential margin (1) is a factor contributing positively (+) to a decision to apply for preferences while on the *contra* side, administrative costs (4) are a factor contributing positively (+) to forego preferences. On the *pro* side, the number of other beneficiaries (either partners in the PTA or the granting of preferences to countries in other PTAs) dilutes the benefits of preferences so they enter with a (-) sign in the pro column. Likewise, in the *contra* column, complexity (3) is attenuated by flexibility in requirements when exporters have several options to satisfy the substantial transformation criterion, so they enter with a (-) sign.

On the positive side, the preference margin (1) is an important determinant entering the decision to apply, though competition from other recipients of preferences through participation in other FTAs reduces incentives to apply. Industry characteristics (2) also play a role. For example, sectors like fashion where profit margins are high and just-in-time delivery to satisfy changing preferences for garments might enter into the decision not to opt for preferential

access. On the other hand, industries with large volumes like automobiles may find small margins attractive. A case in point is the automobile sector under USMCA where ROO requirements are complex. Having a choice among several preferential regimes with a partner (3) enlarges the exporter's menu of preferences and ROO.

Table 4: Decision balance sheet for exporter with preferential access option



Notes: Upward arrows indicate attenuating effects of items in respective columns
Source: Authors' elaboration

On the *contra* side, as evidenced by the literature, four aspects covered here have been explored extensively. Distorted sourcing (1) results from two related requirements present in PSRs. Distorted sourcing (1) from intermediate purchase in the zone (or RVC), which restrict purchases of intermediate materials further down the supply chain and often fall in the 40%-60% range, raise the costs of production. In some cases, technical requirements force producers to use specific inputs or processes of PTA partners. Both requirements which have the same final effect of raising production costs are in effect 'ring fencing' production vertically within the preferential area.

Preferences are not always passed-through entirely (2) to the partner. This can occur because the exporter has to pay some 'extras' beyond administrative costs or, more likely, is a captive market for upstream producers in the partner who will sell the same intermediate inputs at a higher price than to producers outside the zone.

Complexity (3) is the most difficult negative aspect to apprehend. Technical requirements enter on the cost side of compliance, while the possibility of choosing between different ROO requirements reduces these costs. For comparisons across sectors and countries, the literature has often relied on variations of the restrictiveness index presented in section 2.

Finally, administrative costs (4) are a deterrent to apply for preferences. As illustrated below in section 3.3, this cost can be a deterrent for small firms.

3.2 A summary formula[8]

The balance sheet in table 4 suggests a simple formula to summarize the exporter's trade-offs behind the decision to claim preferences. The exporter will file for preferential access when the sum of the compliance costs adjusted by flexibility in requirements in the *contra* column is less than the preferential margin (adjusted for options and competition from other suppliers on the *pro* column). [9]To illustrate, take a shirt producer in Mozambique producing under perfect competition at unit cost of c_i and selling his shirt in South Africa in the SADC preferential area. Neglecting transport costs, the CIF landed price will be $p_i^* = c_i = c_i^0$. This is the price received by the exporter. An MFN tariff, $tar_i > 0$ raises the price of shirts allowing domestic producers to charge the domestic price, $pd_i = P_i^*(1 + tar_i)$.

All exporters that are not SADC members will receive the border price.[10] In the absence of the costs associated with proving origin listed on the right-hand side of table 3, the Mozambican producer would export under SADC preferences. His rent from preferential market access would be the preferential margin, $marg_i$, equal to the MFN tariff. The utilisation rate for the shirt producer i, pur_i , would be unity:

$$marg_i = tar_i \ \rightarrow pur_i = 1 \qquad (1)$$

Many studies reviewed in section 4 have documented that satisfying ROO requirements come with compliance costs. Then, total unit cost for exporters filing under preferential status will include compliance costs, c_i^c , so total costs of exporting to South Africa will be $c_i = c_i^0 + c_i^c$. If total unit costs inclusive of compliance costs are less than the preferential margin (here the MFN tariff), then the Mozambican shirt producer will export to South Africa under SADC preferences (2a). If compliance costs exceed the preferential margin, the exporter will export under MFN status (2b).

$$c_i = c_i^0 + c_i^c = c_i^0 + c_i^D + c_i^A + \mu_i \ \leq p_i^*(1 + tar_i) \ \rightarrow pur_i = 1 \qquad (2a)$$

$$c_i = c_i^0 + c_i^c \ \geq p_i^*(1 + tar_i) \ \rightarrow pur_i = 0 \qquad (2b)$$

Analytically, the compliance cost component can be broken down into three sub-components:

- a distorted cost component, C_i^D, resulting from the beneficiary being forced to source from the partner, for instance, meeting a minimum Regional Value Content (RVC) and/or satisfying the technical requirements listed in table 3;
- an administrative or fixed cost component, C_i^A, related to obtaining the Certificate of Origin (CoO_i);
- a rent-sharing component, μ_i, between the exporter of intermediate goods to the partner exporting the final product to the producer of intermediates. For example, a South African exporter of fabric might charge a higher price for yarn sold to the captive Mozambican producer who has to meet an RVC than to other shirt producers outside SADC.

This decomposition applies equally to PROO and NPROO that determine whether a product is subject to a nation's trade policy (e.g., anti-dumping, health standard). In the case of preferential access, one can say that a ROO is equivalent to a conditional tax: if the PROO is not satisfied, an importer must pay the relevant MFN tariff.

3.3 Distortionary costs caused by Regional Value Content (RVC) criteria

For the majority of PTAs around the world, the Regional Value Content (RVC) minimum is between 40% and 60%. The costs of this PSR will differ across sectors and across firms which makes it difficult to measure its distortionary effects. As an example, take a producer in Mozambique considering selling a shirt, X_i, under preferential access to South Africa (SA), a SADC member that has an MFN tariff of 35% on shirt. This shirt is produced with 'originating' intermediate goods (i.e., with intermediates from other SADC members and from domestic sources), Z^O, but also with inputs, say yarn from non-originating sources, Z^N, e.g. fom Bangladesh or India. Let i stand for the shirt and j for the intermediates, say textiles. Omit any taxes paid domestically, and label each input with its own price, since

[8] This decomposition is also presented in Gourdon et al. (2020)
[9] Erosion of preferences coming from competition with other beneficiaries may be a deterrent to export the good altogether for a SME which can only be detected with data on utilisation by firms. See Carrère, Melo and Tumurchudur (2010) for a comparison of unadjusted and adjusted preferential margins.
[10] The average regional MFN tariff on clothing in SADC is 45%. Access to the South African market tor SADC partners requires satisfying the "double transformation" rule for most members, except MMTZ (Malawi, Mozambique, Tanzania and Zambia) within an origin quota, who only need to satisfy a "single transformation".

intermediates are differentiated products. Let VA_i represent the payments to labour (and to capital or profits). Then, the value of final sales is broken down between payments to value added and to intermediate products split between originating and non-originating:

$$P_i X_i = VA_i + P_j^N Z_j^N + P_j^O Z_j^O \qquad (3)$$

To obtain originating status, intermediate purchases from domestic producers of textiles and from textile producers in the regional partner countries are counted as 'originating' i.e., $P_j^O Z_j^O$ counts as regional value-added. Then, unrestricted originating value-added expressed as a percent of unit sale (evaluated at border prices) is::

$$VA_i^* = \left(VA_i + P_j^O Z_j^O\right)/P_i X_i \qquad (4)$$

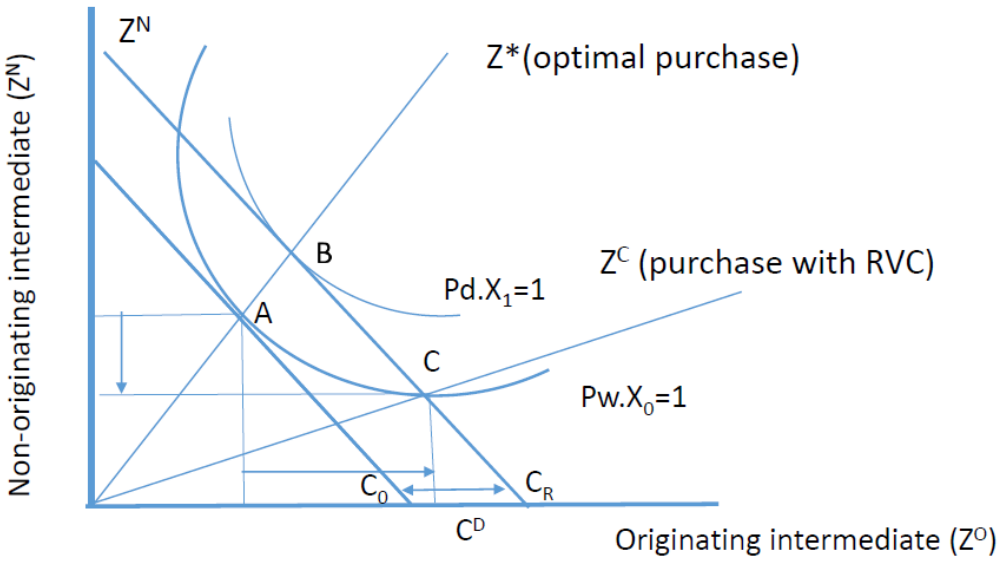
Now suppose that to satisfy origin requirements to sell under preferential status in SA, the producer in Mozambique is forced to source more originating inputs from SADC partners than he would under optimal circumstances (i.e., in the absence of the PSR). If we let an "*" denote the initial unconstrained (i.e., optimal) choice, and a "c" a constrained choice, then modelling the effects of a binding value content boils down to modelling the implications of:

$$VA_i^C > VA_i^* \qquad (5)$$

Figure 6, adapted from Krishna (2006), shows the cost implications for an exporter who needs to meet an RVC to obtain a COO to gain market access. It assumes a competitive environment with a constant-returns-to-scale technology where the producer takes his cost-minimizing decision on the basis of given prices for originating intermediates. When he is unconstrained in his purchase of intermediates, (i.e., when $Z = Z^*$), he produces with the input mix given at A and his costs to produce the unit value isoquant are given by ($C = C_0$). When he is constrained to alter his mix to purchase more originating inputs (i.e., when $Z = Z^C$), he produces the unit value isoquant at C with costs given by ($C = C_R$) and his costs are higher by $C^D = C_R - C_0$.

At unchanged prices for his product and for intermediates, under the RVC the exporter would receive revenue $R_0 = C_0$ while his costs of production would have risen to ($C = C_R$). He will accept to produce at C only if he receives a higher price for his unit value isoquant at B where he produces less because of his distorted input choice. [11]

Figure 6: Distortionary costs of a binding Regional Value Content (RVC)



Note: Let Pw=1. RVC raises costs of producing the unit value good from C^O to C^R. Producer will choose to file for preferential access if per unit price received increases at least to Pd>Pw. and he produces $X_1 < X_0$.
Source: Authors' elaboration based on Krishna (2006)

[11] The unit value diagram known as the Lerner diagram represents an equilibrium under perfect competition when all prices and technology are taken as given.

3.4 Pass-through, restrictiveness, and administrative costs

We now illustrate graphically, the pass-through (μ<1), the administrative costs, (C^A) and the restrictiveness facing a Mozambican producer considering exporting shirts to South Africa. We extend a presentation in Cadot et al. (2008). Let π_R denote profits if the producer fulfils the ROO requirement, and π if he does not opt for preferential access. Let c denote unit production cost, and c_R the combined cost when ROO requirements and certification are factored in, p is the unit world price of the shirt, and t is South Africa's MFN tariff (of 45%) on shirts. If the exporter ships his shirt under the MFN regime, the tariff is due and he receives the world price. His profit is then

$$\pi = p - c \qquad (6)$$

If the double-transformation rule for textiles and apparel under SADC is fulfilled, the producer ships his shirts tariff-free whereas other competitors outside the area pay the tariff at rate t. With complete pass-through, he will receive a unit price of $(p(1+t))$. In practice, for reasons raised earlier, he may face buyers with a significant market power, so the pass-through is likely to be incomplete. Instead, he will raise his price only by a proportion $\mu < 1$ of the preference, receiving $(p(1+\mu t))$. His profit is then:

$$\pi_R = p + \mu t - c - c_R \qquad (7)$$

The net per-unit profit, *b*, from opting for the preferential regime, once the cost of satisfying the ROO requirement, C_R, and the incomplete pass-through are taken into account is:

$$b = \pi_R - \pi = \mu t - c_R \qquad (8)$$

The exporter will apply for preferential access if restricted net unit profits are positive, i.e., if:

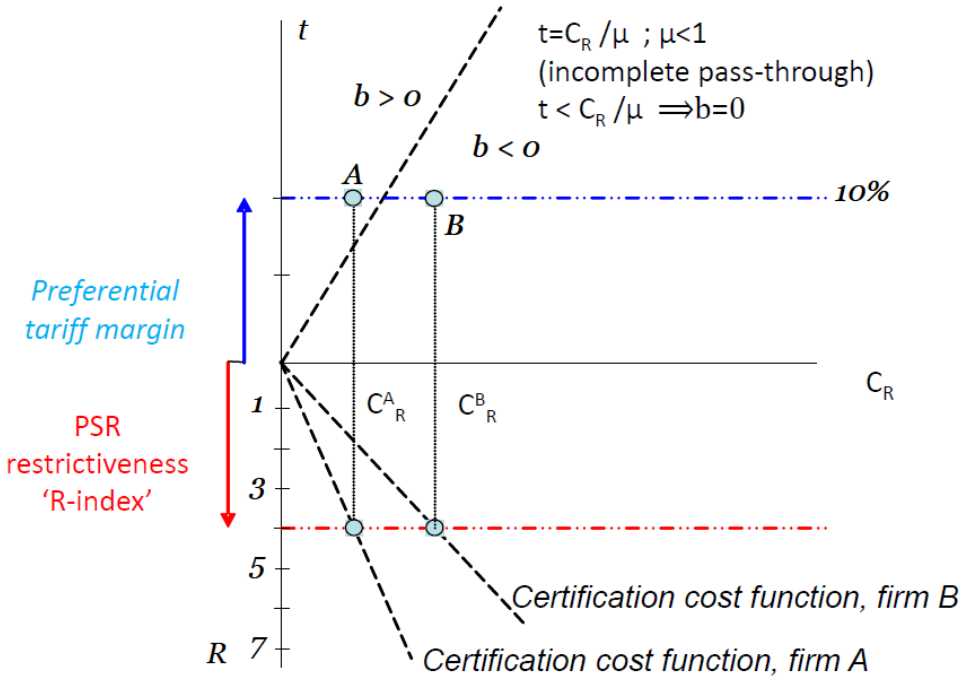
$$t > \frac{C_R}{\mu} \qquad (9)$$

which is the participation condition represented by the straight line in the upper quadrant in figures 7 and 8 that compare two profit-maximizing firms. In figure 7, the two firms have different certification costs and all certification costs are variable. For the sake of clarity, the pass-through is incomplete in figure 7, but complete in figure 8. In both figures, the vertical axis in the top panel measures the MFN tariff, *t*, which is the preferential margin for goods eligible for tariff-free entry (in this example set at 10% for illustration). The horizontal axis measures cost c_R associated with complying with the ROO requirement. The vertical axis in the bottom panel measures the value of the index of restrictiveness (the ordinal 'R index' used as a proxy for ROO stringency). The two dotted lines in the bottom panel link firm costs to restrictiveness levels, here assumed to be linear in the value of R. For a given value of R, certification costs are lower for type A firm than for type B firm, i.e.: $C_R^A < C_R^B$ at any value of R.

For a value of 4 for R, firm A will use preferences since its profits are positive (point A) while firm B will not (negative profits at B). In this simplified representation of the apparel sector in Mozambique with an equal number of each type of firms, the utilisation rate would be 50%. With twice as many type A as type B firms, the industry utilisation rate would be two thirds, and so on.

Figure 7 also illustrates that if ROO become more restrictive, say the ROO index increases from 4 to 6, both firms would give up the use of preferences. Analogously, if the level of preferences were to fall from 10% to 5% (the lower value indicated on the vertical line), both firms would also give up the use of preferences. Conversely, simplified ROO generating lower costs of certification would rotate the lines in the bottom panel clockwise resulting in an increase in the utilisation rate. Finally, a lower value of the pass-through parameter, μ (say because exporters lose market power) rotates the dotted line in the top panel clockwise, also raising the utilisation rate.

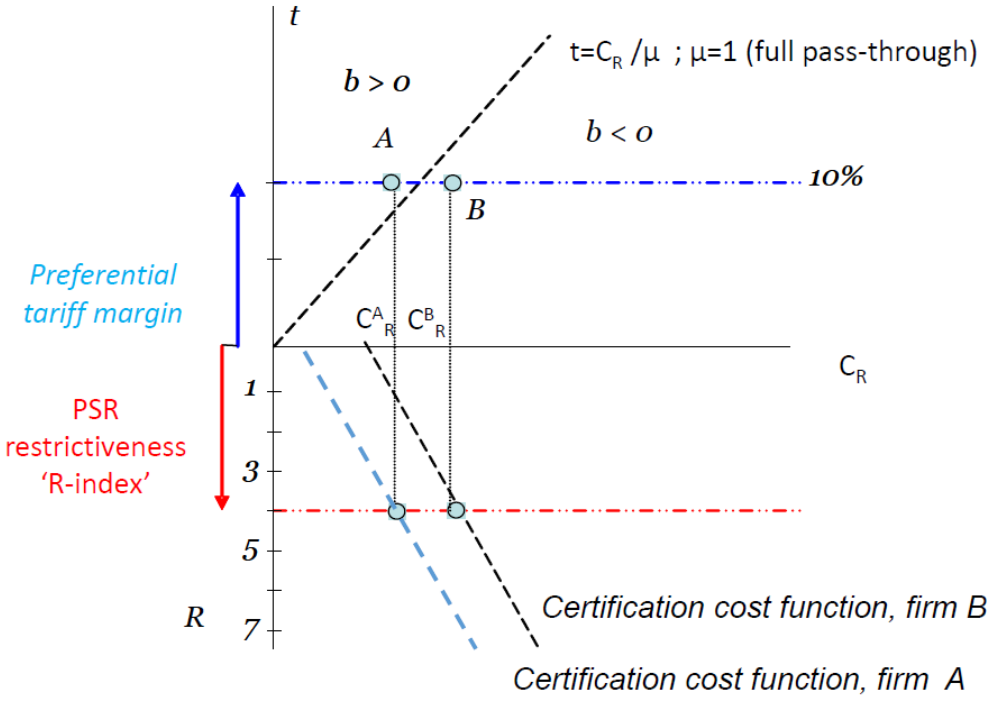
Figure 7: Variable certification costs, and utilization of preferences



Source: Authors' elaboration based on Cadot et al. (2008)

Figure 8 illustrates another aspect of certification costs also associated with firm heterogeneity. Here, both firm A and firm B have the same variable fixed costs but firm A has lower fixed costs. Firm A will opt for filing with preferences while firm B will not. This case illustrates that small firms can be at a disadvantage, both because of smaller shipments, each with fixed costs and because of higher fixed costs for a specific shipment size.

Figure 8: Different fixed certification costs and utilization of preferences



Source: Authors' elaboration

The graphical presentation above can be summarised as follows:

1. For a given depth of preferences, all other things being equal, more restrictive ROO result in a lower use of preferences, and conversely.

2. For a given level of ROO restrictiveness, a higher preference margin leads to a higher use of preferences.

3. Decisions concerning the use of preferences by firms are binary (yes or no); the way these decisions accrue in a rate of utilisation of preferences at the sectoral level depends on the –unobserved – distribution of costs of compliance.

4. A lower price pass-through of preferences produces, *ceteris paribus*, a weaker use of preferences.

5. An improvement in the use of preferences can be obtained either by a reduction of the restrictiveness of the ROO or by administrative simplification reducing the costs of certification.

The discussion in this section suggests an unambiguous relationship between preferential margins, ROO restrictiveness, certification costs, and the use of preferences. An analysis of the effect of preferences not taking into account the restrictiveness of ROO would thus be affected by what econometricians call an 'omitted variable bias'. However, the relationship can only be measured with error leading under most circumstances to 'attenuation bias', i.e to an underestimate of the costs of ROO restrictiveness when based on analysis at the tariff-line level, as the distribution of certification costs across firms is not the same for all tariff lines. These observations explain why few robust stylized facts emerge throughout the literature reviewed in section 4.

Overall, the discussion illustrates the saying that in practice, "PTAs hand out market access with one hand and take it away with the other" through restrictive ROO.

4. Summary evidence [12]

In practice, it is difficult to disentangle these preference utilisation components. Firms have different production costs, may produce more than one product, and prices will deviate from production costs when production does not take place under perfect competition. On the data side, only a few countries publish trade statistics according to the trade regime requested by exporters.[13] This means that data on utilisation of preferences (*purs)* are rarely available beyond the cases discussed below. Data at the transaction level needed to estimate these costs are generally not available, making it even harder to estimate fixed compliance costs. As shown in the review of the evidence, in general, studies do not have enough information on firm characteristics to isolate the effects of different ROO with confidence. Finally, it must be kept in mind that, at best, positive utilisation rates only suggest that preferential margins are greater than compliance costs rather than provide an estimate of the costs of compliance. We review briefly selected evidence omitting results from simulation models and heterogeneous firm models.[14]

4.1 Utilisation of Preferences

[12] Recent comprehensive surveys include WTO (2011a and b) Abreu (2016). UNCTAD (2019) has case studies covering African PTAs. Contributions in Cadot et al. eds (2006) and Estevadeordal and Suominen eds. (2006) cover the economics of ROO. Inama (2009) concentrates on the drafting and administration aspects of ROO.

[13] Main countries are Australia, Canada, the European Union, Japan and the United States. No granular data is publicly available for utilisation of preferences by their exporters in partner countries, so it is difficult to estimate the use of preferences of these countries' exporters in these partners. Nilsson (2016) and Kasteng and Inama (2018) estimate that about two-thirds of EU exporters use tariff-free access in their exports to partners while partners use preferences for over 90% of their exports to the EU. Thanks to data on the EUs *purs,* Crivelli et al. (2021) identify critical products warranting further scrutiny of their ROOs, i.e., *purs* below 70% and preference margins above 2 percent.

[14] Building on the Melitz (2003) heterogeneous firm model, Cheraskin et al. (2015) estimate that, for Bangladesh, subsidies applied to fixed costs have a greater impact on exports than subsidies to entry costs. Hayakawa et al. (2019a and b) estimate a fixed-cost ratio of utilisation preferences for Japan's PTAs. They show that their shortcut method relying only on import data by tariff schemes delivers fixed-cost ratios that are higher for products making use of more inputs. They estimate that Japan's imports from PTA partners under preferential status requires 8-10% additional fixed costs.

NAFTA, which built on US-Canada FTA of 1987, was one of the first FTAs with an extended set of ROO (see Krueger (1993) and Estevadeordal (2000). Another was the Pan-Euro-Med (PEM) system of PSRs applied by the EU across-the-board to its many PTA partners. National-level data on *purs* are available for both.

Under the assumption that exporters know that preferential market access can be obtained if ROO requirements are fulfilled, and that they have the information on these requirements, utilisation rates of preferences have been used to check conditions (2a and b). Comparisons of NAFTA and PEM reported in Cadot et al. (2006, figure 3) revealed that the same sector faced very different PSRs under both regimes. Estimates of compliance costs from threshold (and other) techniques applied to data at the sector, suggest compliance costs in the $3\%<C^C<5\%$ range (Francois et al. 2006, Carrère and Melo 2006).

This suggests that exporters should not export under a preferential regime if the preference margin is less than 3%. Yet, there is plenty of evidence that exports take place under preferential regimes with lower preference margins. For example, under NAFTA, for car imports where the PSR is relatively stringent by global standards (tracing list with RVC 62.5%), utilisation was high (more than 80%[15]), a reminder that low margins and complex ROO can still be associated with high rates of preference utilisation, when annual shipments worth tens of billions of dollars are at stake. This example shows that the magnitude of preference margin is not the sole determinant of the degree of preference utilisation. Krishna et al. (2021) use highly disaggregated data of importer-exporter matched transactions level customs data on imports by Colombia from Argentina and Peru for several years. Their figure 3 shows both that preference utilisation increases with the value of the transaction and, for a given product, the number of years the product is exported.

Several estimates show high *purs* for preferential margins below 3% (see e.g., Keck and Lendle (2012) and Powers and Ubee (2020, Table 7) for US FTAs). This implies that administrative costs must be low. Using pseudo-transaction level data[16] constructed from monthly import data for four countries (Australia, Canada, EU and US), Keck and Lendle (2012) estimate low administrative costs in the range $\$14 < C^A < \$1500$.

Drawing on transaction level data of exports by each EU country to Iceland, Albert and Nilsson (2016) use the Hansen threshold estimation procedure to estimate lower fixed cost thresholds in the range $€20 < C^A < €260$. So, even if duty savings from importing under preferential access are low because of low preference margins, these estimates validate the observation of high preference utilisation rates when preference margins are low.

This suggests that fixed costs arise at the firm transaction-level. Thus, large firms could more easily absorb fixed cost e.g., through abundant human and IT accounting resources. For commercial-size transactions, it might also indicate that ROO were perfectly tailored by policy-makers to reflect the regional productive capacity of the firms, and there is no entrepôt trade.

Nonetheless, case study evidence suggests that these compliance costs can be high, especially for firms exporting to several markets under different PTAs. Gillson (2012) reports estimates for Shoprite, a South African retailer exporting to several countries in Southern and Eastern Africa. He reports estimates of the administrative costs incurred by *Shoprite* across SADC, in 2009. Preferences were worth $13.6 million on $550 million sales. The company estimated costs of compliance at $5.8 million with a breakdown of 40% for staff to maintain customs data, 40% on in-house clearing and forwarding and 20% on the maintenance of a library to demonstrate compliance with rules of origin.

4.2 Third-country trade effects

Estimates of high reduction in imports from third countries, is evidence of distortion costs induced by restricted sourcing are high. Cadot et al. (2005) estimate the rent-sharing component for apparel under NAFTA. They estimate that the technical requirement forcing Mexican apparel producers to source cotton from the US for use in that type of apparel raised cotton prices by 11.9%. And Cadestin et al. (2017) estimate that for Latin America, on average, RoO have tariff equivalents for intermediate products that enter into supply chain trade, of respectively, of around 11% and 9% for intra and extra-regional trade agreements in Latin America and the Caribbean.

Using a triple difference-in-difference technique that controls for time-invariant unobservables and general trends at the product level coupled with input-output linkages distinguishing goods originating from NAFTA from those originating in other countries, Conconi et al. (2018) estimated that ROO on final goods reduced imports of affected

[15] See Powers and Ubee (2020, table 7).
[16] Keck and Lendle (2012) have access to high frequency data by month at the district level. Using combinatorics, they make assumptions about the likelihood of observing more than one observation per month in individual districts from which they derive a subset of the data that is likely to be close to individual transactions.

intermediates from third countries by 45%. They concluded that, even though preferential ROO are not GATT-restricted their estimates indicate a clear violation of the spirit of the GATT (article XXIV 5(d)) which stipulates that duties and other regulations should not be higher than previously.

4.3 Choice of rules

Studies have also shown that the choice of rule of origin matters. Textiles & Apparel (T&A) and most recently the automotive sector under the US-Mexico-Canada (USMCA) FTA, both have complex PSRs.

Augier, Gasiorek and Tong (2005) estimated ROO restrictiveness in cross-section bilateral trade in manufactures and in parts and components for the EU and a sample of industrialized countries with PTA partners. Having accounted for the usual controls in a gravity equation, they estimate a positive coefficient for belonging to a PTA and a negative coefficient if cumulation is not allowed for the exporter. With no cumulation, Augier et al. estimate that trade has been 50% less than expected with the impact most notable for trade in intermediate goods. Further panel estimates by Park and Park (2011) for bilateral trade of 154 countries over 1980-2005 capturing all RTAs reported to the WTO suggests a statistically significant positive association (trade-creation effect) of the intensity of bilateral trade among RTA members and a statistically negative correlation (trade-diversion effect) on the intensity of bilateral trade between RTA members and outsiders. Their results show the strongest trade-creation effect for full cumulation, followed by diagonal cumulation, and an insignificant trade-creation effect for bilateral cumulation.

Bombarda and Gamberoni (2019) give evidence that switching from bilateral to diagonal cumulation for all EU PTAs with the Pan-Euro-Mediterranean countries led to a reorganization of sourcing decisions by the 'spoke' partners (i.e., countries in the periphery). Spokes reduced their imports of intermediates from the rest-of-the-world towards those in the new PANEURO system. The possibility to cumulate led peripheral countries to re-organize international value chain links.

4.4 Preference margins and complexity of ROO.

The large number and complexity of ROO in certain sectors has long been documented, most recently the automotive provisions in USCMA. [17] Traditionally, the T&A sector where preference margins are high in the EU and the US, has had complex ROO and relatively low *purs*, suggesting that these rules were tailored to benefit narrow interests resulting in a suppression of intended preferences. As shown in Gourdon et al (2021b), relatively high preference margins also apply for intra-African trade raising the flag that negotiators might end up with product-specific rules that will prevent the development of a continental-level market in T&A.

Because preferential ROO are not regulated by the WTO, unlike tariff schedules, they are a fertile ground for policy 'innovations' driven by a desire to achieve strategic, social and environmental goals through obfuscating methods to achieve redistributive objectives.[18] The recent revision of NAFTA is a case in point. The USMCA FTA provides an interesting window on the bargaining over sharing rent between members in reciprocal PTAs. Leveraging on the high intensity of competition among automakers in US market, USMCA negotiators decided to "raise the bar" of the North American content required in originating cars. The RVC was raised from 62.5% to 75% with a gradual staging.

Additional "innovations" were added to stimulate socially and nationally desirable goals. For example, a certain percentage of a car should be produced with regional labour above a wage threshold, which is a practical remedy for relatively inferior labour working conditions in Mexico and could be communicated by negotiators as an attempt to share the prosperity among North American workers.

In terms of practical FTA depth, unlike declarations about the promotion of decent labour conditions typically found in FTAs, this requirement is enforceable. As such, it should have a much greater impact than mere declarations about working conditions typically drafted in FTAs. The novel USMCA ROO also promotes the use of North American steel and aluminium in North American cars by specifying a certain minimum percentage threshold. This was to address the concern of a dwindling US steel and aluminium industry, which represented a national security threat in the eyes of the US administration at the time.

4.5 Trade deflection

[17] USITC (2019, figure ES1) documents the components of automotive ROO. For light vehicles, they include RVC (4 different percentage rates), steel content, aluminium content further detailed into (by weight), and labour value content at a specific minimum-threshold wage.
[18] The word 'obfuscating' is borrowed from Magee et al. (1989) description of the makings of tariff policy.

Preventing trade deflection (i.e., importing from the low tariff partner in an FTA and re-exporting to a high-tariff partner) is one of the two main rationales for ROO. To be profitable, the gain from arbitrage must exceed the transport costs from the low to the high tariff partner. As surveyed by Anderson and Van Wincoop (2004), transport cost makes up a trade cost equivalent of 21%, half of which is freight costs, the other half, the time value of goods in transit. Felbermayr et al. (2019) construct pair-product specific transport costs[19] that they confront with differences in pair-product bilateral tariffs for 600 RTAs (both non-reciprocal and reciprocal). They show that trade deflection is not profitable for 86% of bilateral product-level comparisons in FTAs and for 98% in unilateral trade preferences (AGOA, EBA, GSP).

The Felbemayr et al. results take care of the importance of trade deflection as a justification for ROO. However, note that:

(1) The deflecting traders would not think of triggering duty drawback on tariffs and taxes upon re-exportation, which is allowed in most countries. In efficient trade management, tariffs and taxes are typically paid only at the final destination upon entry into consumption, not at each intermediate destination.

(2) The entrepôt country through which trade deflection occurs somehow compensates the final-destination country for the tariff revenue foregone, or the final-destination country is ignorant of its revenue and does not implement controls. Typically, customs vigorously monitor trade deflection of significant trade flows and intervene to prevent unintended behavior of traders by e.g. suspending preferences or requiring additional evidence.

(3) Notwithstanding (2), domestic producers will close their eyes on foreign competitors free riding on their preferential rents secured by negotiators.

The authors recommend that ROO should be dispensed with for products where preferential margins are in the “tariff nuisance” range, i.e., less than 2 percent. Note, however, that in practice, customs in most countries are already implementing this policy, as they follow “risk management” approach where they maximize tariff revenue taking into account enforcement costs. As an example, if a one-off shipment worth $10,000 with a preferential margin of 1% is calling into the port, customs officers might waive ROO inspection because the administrative costs of inspection labor outweigh the expected customs revenue, potential penalties included.

4.6 Firm-level evidence

The evidence on relation between preferential margins, ROO restrictiveness and preference utilisation is murky because of limited data on firm characteristics that might affect the utilisation of preferences and their effects.

Several studies show that relaxation of ROO in apparel from double to single transformation leads to increased preference utilisation rate and preferential imports in total, given the preferential margin. For supporting evidence on non-reciprocal ROO see Melo and Portugal-Perez (2014) for AGOA and Brunelin et al. (2019) for Jordan’s exports to the EU and US. For EBA, see Crivelli and Inama (2021) and Sytsma (2021a).

The quasi-experimental characteristic of relaxing the transformation rule in Textiles & Apparel under AGOA and EBA lends support to the results in these studies that show in both cases an increase in the utilisation of preferences. Using firm-level transaction data for Bangladesh, Sytsma (2021b) estimates that ROO compliance costs under double-transformation amounted to ¾ of the preferential margin.

Cadot et al. (2014) use Colombian firm data to explore the determinants of preference utilisation. They find that preference utilisation is higher for larger firms but lower for those that use a wider sourcing of intermediates. They also find that preference utilisation correlates strongly with export growth and more so for large firms. In this study, as in most firm-level datasets, “exporting firm” is not necessarily the producer. The exporter could be a brokerage firm—see the discussion on a survey of the Belgian Foreign Trade Agency below - which muddies the results. A recent survey by Belgian Foreign Trade Agency (2021) shows that preference utilisation may vary by type of the firm. For example, take a pure producer who subcontracts a third party to manage export and import operations. The subcontractor or the firm might not be aware of overseas preferences and the required procedures.

WTO secretariat’s findings (2021) based on LDC non-reciprocal preferential schemes indicates that machinery and electronics are sectors with the lowest utilisation. However, fruits, vegetables and cereals also exhibit low utilisation

[19] The authors did not have exact freight rates between all country pairs for each product. Instead, they used granular import data of the United States which reports both FOB and CIF unit values. The difference between CIF and FOB should, on average, represent transport costs (freight and insurance).

rates, despite relatively high preference margins, which in the context of Cadot et al. (2014) is puzzling. There is a cross-country heterogeneity, as some LDC countries exhibit overall high utilisation rates (e.g., Lesotho) while other exhibit low utilisation rates (e.g. Guinea and Sierra Leone). Finally, they document that land-locked status dampens preference utilisation across the board, which might be related to the 'direct shipment' requirement in many PTAs.

Albert and Nilsson (2016) in the case of EU exports to Iceland find signs of a fixed-cost in ROO ranging in €20 < C^A < €260. However, because 2/3 of their data set are likely small-value express consignments, their estimates of COO issuance and verification costs are probably not representative.

In a study of Japanese imports from Thailand, Hayakawa et al. (2016) report median cost estimates of FTA utilisation in the $1000-$2000 range. In another study Hayakawa et al. (2019) report the ROO part in fixed-costs of about 3-4%. These high estimates reflect that COO fixed-costs go beyond the issuance fee, as the exporter has to provide documentary evidence and always be ready for customs audits, including on-site, and potential penalties. This kind of fixed costs (incl. administrative time delays combined with large amount of documents to gather and unjustified fees) are prominent culprits in ITC NTM business survey results (2015).

Certain firms might have serendipitous factors for not using preferences. For example, use of ROO implies disclosure of all invoices and supplier contracts to local and/or foreign customs during verification, which a firm might find unacceptable from a business confidentiality perspective.

Other firms might decide that existing supply chains outweigh potential preferences. For example, most of Arab countries prohibit any Israel content in imported goods. But a company relying on Israeli inputs, or not knowing if there are any traces of Israel inputs, might find this rule too rigid. Another company might rely on entrepôts or outward processing as part of its trade management strategy, and in this case complying with ROO provisions is strenuous. These cases can be considered as 'legitimate', in the sense that the decision not to use ROO was taken consciously.

5. Looking ahead: what we need to know

The creation of the WTO has brought agriculture into the realm of international trade disciplines and eliminated quotas and bilateral trade arrangements like voluntary export restraints which were progressively replacing tariffs as forms of protection. Non-tariff measures (NTMs) like technical barriers to trade and sanitary and phytosanitary (SPS) measures are now also subjected to the transparency and non-discriminatory pillars of the multilateral trading system. Preferential Trading Arrangements (PTAs) became *de facto* the only accepted exception to the principle of non-discrimination. For several reasons including the deadlock at an ever-expanding agenda at the WTO negotiations, PTAs, often driven by geopolitical motives, have become *de facto* the main instrument at deepening market integration. Rules of Origin are then necessary to prevent trade deflection (sneaking into a free trade area by the partner with lowest MFN tariff) and transshipment (e.g., packaging via labelling). ROO have also served to 'ring fence' development strategies in the membership area while countries have engaged in multiple, often overlapping PTAs.

ROO have proliferated along with the growth of PTAs. For example, ITC's Rule of Origin Facilitator (ROF) records the 54,000 texts classified as 'different' even though, as discussed in this paper, at times distinction is more about form rather than substance. (The number of recorded ROO is about 10 times more than the number of product lines at the HS6 level recorded across all countries). With multilaterally bound tariffs no longer on the decline, PTAs are likely to continue to grow and, with them, ROO. This paper offers a description of this mosaic, using measures to 'map' these rules into categories in terms of their objectives and their complexity. New information technologies will certainly reduce costs of obtaining certificates of origin that must be obtained in the exporting partner.

However, as documented by interviews reported in ITC (2015), small firms, especially in developing countries, will continue to report that obtaining these certificates is the most cumbersome NTM, especially in manufacturing, precisely the sector developing countries are aspiring to develop. The key question then is whether, as shown in several examples reported in this primer, these rules are often unnecessarily complicated, raising trade costs beyond levels necessary to prevent transshipment and trade deflection.

Unfortunately, in spite of increased recording in easily accessible formats, it is difficult to inform policy-makers on the extent to which ROO raise compliance costs unnecessarily. On the data side, only a few countries publish trade statistics according to the trade regime requested by exporters. This means that data on utilisation of preferences are rarely available beyond the cases discussed in this paper. Furthermore, when available, these data are not available at the firm and transaction level so that one cannot disentangle fixed from variable compliance costs. This information

would be needed to control for firms having different production costs, may produce more than one product, and prices will deviate from production costs when production does not take place under perfect competition.

On the brighter side, this bottleneck on data availability may be easing. Recent initiatives at the WTO (annual member notifications of LDC preferential imports at the tariff-line level) and the ITC-WTO-WCO global database of product-specific and general rules of origin are examples of recent innovations that one can 'move the needle' in our understanding of the global landscape of these policy measures.

We conclude this tour d'horizon with suggestions for improvements along three dimensions: data on preference utilisation; deeper and more comprehensive codification of ROO; expansion of business surveys.

Data on preference utilisation. The slow progress in availability of import statistics by type of preferential regime, especially in developing countries, can be due to political sensitivities (especially, if preference utilisation is abysmally low for undetermined reasons) and unavailability of staff resources at customs to extract and package the data. For the transaction-level data, the sensitivity can be for commercial reasons: even after masking firms and transactions with numeric IDs, sometimes the firm can be inferred from the data, hence business confidentiality can be undermined. Possible (partial) solutions:

- Rather than publishing the data at original level of granularity, compile and publish aggregated indicators (e.g., at HS2, HS4 or HS6 and/or by region) to give an initial sense of uptake of preferences;
- Provide for non-disclosure agreements, e.g., with academia or technical trade organisations, in order to get robust, objective advice based on existing literature and best practices, to help improve future trade policies using ex-post evaluation of existing trade agreements;
- Integrate relevant data-disclosure clauses in FTAs. New generation of FTAs contains clauses where parties are obliged to exchange preference utilisation statistics for monitoring purposes. In practice, this exchange often takes place on confidential basis. However, nothing should prevent the parties to publish the data upon mutual consent.

Since the methodology to report these trade statistics is standardized and reported on a regular basis at increasing frequency by many countries, in principle, nothing should prevent reporting these trade statistics further disaggregated by customs regime. It is important to take the first initial step, and ITC Market Access Map and Rules of Origin Facilitator will lend support for development of methodologies in variables and statistical data cleaning as well as data display for MSMEs and policy-makers.

Codification of rules of origin. As shown in this paper, there are gaps in codification of rules of origin, understanding better the cost implications of general 'regime-wide rules', and codifying NPRO. Better understanding of the similarities between NPROO and PROO could create synergies in the context of WTO harmonization negotiations on NPROO ongoing since 1990s. The collection and codification of NPROO is envisaged to be conducted in the future jointly by WTO and ITC based on detailed notification templates under consideration for adoption by WTO members on multilateral basis.

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